

HUMAN FACTORS:

Avoid the Dirty Dozen with Safety Nets

By Gordon Dupont, President, System Safety Services

I have had students say they don't need human factors training because it is just common sense. Nothing could be further from the truth. In my many years of accident investigation, I have met all too many very qualified and conscientious maintenance personnel who have made mistakes in simple tasks.

Human factors training is nothing more than training a person how to avoid the error they never intend to make. It calls for providing the person with information on what can set up him/her to make an error, and more importantly, what "safety nets" the person can put into place in order to prevent an error from occurring or prevent an error from causing an accident.

A safety net could include developing the habit of always going back three steps in your work after being distracted. The training teaches you that your mind can work faster than your hands, and thus you may think and believe you have completed a task when in fact you have not. Looking at our plumbing lines, a safety net of always using TorqueSeal to mark lines as they were tightened would help, as would a dual inspection by a second person to help ensure that no line was left loose.

To Error Is Human.

Ever since Eve made the error of eating the forbidden apple, we humans have been making human errors. To lessen errors being made, we have tried to "Murphy-proof" everything we come in contact with. For example, you can't start your car unless it is in neutral or park, and you can't retract the landing gear on the ground. We also have rules, laws and regulations to reduce human errors. You must stop at a red light even though common sense tells you there is no one around and it would be safe not to do so. We try to prevent errors from causing an accident or at least lessen the consequences when we make an error. For example, we install warning horns that let you know that you forgot to lower the landing gear before you land or seat belts to keep you safer if you chose to ignore the horn.

We have attempted to error-proof the aircraft to the extent that we have a whole new set of problems when pilots look at each other and ask themselves: "What's it doing now?" As for rules, we have so many that there are rules for the rules, and few of us can remember them all, but in spite of that, human error is still our biggest problem. In order to further reduce human error, we must provide the correct training to everyone in the organization.

The Dirty Dozen

Correct training is training that the participants will believe in and apply. Human factors training should be centered around the "dirty dozen." These are the 12 contributing factors that can set you up to make an error no matter what your occupation:

1. LACK OF COMMUNICATION - This is simply the failure to exchange information. The training should focus on not only how this comes to happen, but also what safety net will prevent it. Very simply, in good communication, "the mental pictures must match."

2. **COMPLACENCY** - This is where we become so self-satisfied that we lose awareness of dangers. It is sometimes called overconfidence and creeps in as we become more proficient at what we do. Awareness of this insidious contributing factor is one of the safety nets that helps to reduce it.
3. **LACK OF KNOWLEDGE** - With constantly changing technology, this contributor to an error is more common than we think. Add to that the fact that the average human only retains about 20 percent of what they learn, unless they use it often. Training is one of the best safety nets we have to help avoid human error.
4. **DISTRACTION** - This is anything that takes your mind off the job at hand even for an instant. Our mind works much quicker than our hands, and thus we are always thinking ahead. Any distraction can cause us to think we are further ahead than we actually are. This contributing factor is known to be responsible for at least 15 percent of all aviation accidents.
5. **LACK OF TEAMWORK** - The larger an organization becomes, the more common this contributing factor is. Because teamwork is constantly evolving and changing, it must be constantly worked on to prevent accidents from occurring. It is hard to gain and very easy to lose.
6. **FATIGUE** - This is considered the number one contributor to human error. It is insidious, and the person fails to realize just how much his/her judgment is impaired until it's too late. Fatigue seldom works alone but is a contributor to one or more of the other dirty dozen.
7. **LACK OF RESOURCES** - Lack of resources to safely carry a task has caused many fatal accidents. For example, an aircraft is dispatched without a functioning system that normally would not be a problem suddenly encounters circumstances where it does become a major problem.
8. **PRESSURE** - Pressure to be on time is ever-present in the aviation industry. We are very time-sensitive and many decisions center around that fact. Over 64 percent of pressure-caused errors are caused by self-pressure. One has to learn how to recognize and deal with pressure.
9. **LACK OF ASSERTIVENESS** - Lack of assertiveness in failing to speak up when things don't seem right has resulted in many fatal accidents. However, assertiveness also calls for listening to the views of others before making a decision. Assertiveness is that middle ground between being passive and aggressive.
10. **STRESS** - Stress is the subconscious response to the demands placed upon a person. We all have some stress in our lives, and it is not all bad until it becomes excessive and we have distress. We must learn how to manage stress, or it will manage us with a high probability that human error will occur.
11. **LACK OF AWARENESS** - Lack of awareness occurs when there is a lack of alertness and vigilance in observing. This usually occurs with very experienced persons who fail to reason out possible consequences to what may normally be a good practice. One of the safety nets for lack of awareness is to ask more "what ifs" if there is conflicting information or things don't quite seem right.
12. **NORMS** - Norms is short for "normal," or the way things actually are done around an organization. Norms are unwritten rules followed or

tolerated by the majority of a group. Negative norms are those that detract from an established safety standard.

Human factors training can reduce errors, but we must also provide a work environment that is resistant to human error. This is the role of a safety management system (SMS), of which human factors training is a part.

Human factors training will help ensure the success of any SMS and is an integral part of any effort seeking to reduce human error. We can and must do better - our lives depend on it.

Gordon Dupont has been an Aircraft Maintenance Engineer in Canada, the United States, and Australia for over 30 years. He was the Principal of Pacific Vocational Institute, an aircraft maintenance school. As an investigator for the Canadian Aviation Safety Board and the Transportation Safety Board, he saw the need for training in human factors for maintenance personnel. He is now CEO of System Safety Services.