

7.0 THE DIRTY DOZEN ERRORS IN MAINTENANCE

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PURPOSE

The dirty dozen maintenance errors posters were designed to be a follow up to the two-day "Human Performance in Maintenance" workshop offered by Transport Canada and numerous other companies which have adopted this workshop. The purpose was to maintain the level of awareness which maintenance personnel take from the workshop. By displaying one poster each month, complacency, where one no longer notices the posters, is avoided. The posters are designed to be used in all segments of aviation (i.e., major airline, general aviation and helicopter) and depict scenes most maintainers can relate to, no matter what branch he/she works in.

WHAT ARE THE DIRTY DOZEN?

The dirty dozen are the 12 most common causes of a maintenance person making an error in judgment which results in a maintenance error. The posters also offer safety nets which can be used to help avoid the error in judgment. Errors, when they occur, will likely be found to be caused by one, or even more common, a combination of the following causes. These dirty dozen causes of error are:

1. Lack of Communication

Lack of communication can be in the form of verbal or written or a combination of the two. The poster depicts leaving a panel undone and surmising that day shift can finish the job. The safety nets: a) Use logbooks, worksheets, etc. to communicate and remove doubt. b) Discuss work to be done or what has been completed. c) Never assume anything.

2. Complacency

Complacency is an insidious cause which with the constant repetition of many maintenance inspections can cause or contribute to an error in judgment. The poster depicts a maintenance person walking away from an aircraft which has a frayed cable behind a multi-screwed panel. He has signed the inspection sheet and is saying to himself "I've looked back there 1,000 times and never found anything wrong." The safety nets are: a) Train yourself to expect to find a fault. b) NEVER sign for anything you didn't do.

3. Lack of Knowledge

In this ever changing world, Lack of Knowledge is not that uncommon a cause of an error in judgment. When coupled with the "Can-Do" attitude of most maintenance personnel, it becomes even more probable. The poster depicts a helicopter technician with a bent part in his hand saying, "This is the third one to bend! What's going on?" The safety nets offered are: a) Get training on type. b) Use up to date manuals. c) Ask a Tech. Rep. or someone who knows.

4. Distraction

This cause is thought to be responsible for about 15% of all maintenance errors. One leaves a task (both physically and/or mentally) for any reason and returns thinking that he/she is further along with the task than they are. The poster depicts a maintainer being called away from a job to answer a phone call from his wife. The safety nets listed are: a) Always finish the job or unfasten the connection. b) Mark the uncompleted work. c) Lockwire where possible or Torqueseal. d) When you return to the job always go back three steps. e) Use a detailed check sheet.

5. Lack of Teamwork

This cause is often tied in with lack of communication but can be responsible for major errors. With maintenance often involving a multitude of workers, good teamwork becomes essential. The poster depicts two persons guiding an aircraft in, in opposing directions. The caption says "I thought you wanted him to turn left right here!" The safety nets call for: a) Discuss what, who and how a job is to be done. b) Be sure that everyone understands and agrees.

6. Fatigue

Fatigue is a very insidious cause because, until it becomes extreme, the person is usually unaware that he/she is fatigued. They are even less aware of what the effects of fatigue are. The poster depicts a person walking off the end of a horizontal stabilizer commenting that he is glad the double shift is over. The fatigue safety nets call for: a) Be aware of the symptoms and look for them in yourself and others. b) Plan to avoid complex tasks at the bottom of your circadian rhythm. c) Sleep and exercise regularly. d) Ask others to check your work.

7. Lack of Resources

No matter who the maintainer works for, there are times when there is a lack of resources and a decision must be made between ground the aircraft or let it go. The average maintainer is a "Can-Do" type of person and takes great personal pride in repairing aircraft. Thus the decision to be made can be difficult. The poster depicts a maintainer standing in front of a helicopter with a skid on the right side and a float on the left. The caption says "We have nil stock of left skids so I guess this will have to do." The safety nets are: a) Check suspect areas at the beginning of the inspection and [AOG](#) the required parts. b) Order and stock anticipated parts before they are required. c) Know all available parts sources and arrange for pooling or loaning. d) Maintain a standard and if in doubt ground the aircraft.

8. Pressure

Few industries have more constant pressure to see a task completed. The secret is the ability to recognize when this pressure becomes excessive or unrealistic. The poster depicts a captain looking at his watch as a maintainer rushes to close up a panel, with a line sticking out of it. The caption says "Hurry up or we're going to be late again!" The safety nets to counteract this are: a) Be sure the pressure isn't self-induced. b) Communicate your concerns. c) Ask for extra help. d) Just say No.

9. Lack of Assertiveness

The average [AME/AMT](#) is not an assertive person and most of the time his job does not require him/her to be. However there may come a time when something is not right and he/she will have to be assertive in order to ensure the problem is not overlooked. The poster depicts a float plane leaking oil into the water and the aircraft owner telling the maintainer that he owns the aircraft and he says it's NOT a bad leak. The counteracting safety nets offer: a) If it's not critical, record it in the journey log book and only sign for what is serviceable. b) Refuse to compromise your standards.

10. Stress

Stress is a normal part of every day life until it becomes excessive. The secret is to be able to recognize when it is becoming excessive. The poster depicts a maintainer pulling his tool rollaway, toward the propeller of a running engine. The caption says: "We lost our best aircraft! How are they going to pay my wages? What if I'm sued?" Stress safety nets call for: a) Be aware of how stress can effect your work. b) Stop and look [rationally](#) at the problem. c) Determine a rational course of action and follow it. d) Take time off or at least have a short break. e) Discuss it with someone. f) Ask fellow workers to monitor your work. g) Exercise your body.

11. Lack of Awareness

This often occurs to very experienced maintenance personnel who fail to think fully about the possible consequences of work they are doing. Manuals do not cover the failure and after the fact one will often hear that common sense should have told you that. The poster depicts a passenger flying forward in his seat and striking a bulkhead mounted fire extinguisher with his head. The caption says: "All the regulation said was, 'Install Where it is Easily Accessible.'" The safety nets are: a) Think of what may occur in the event of an accident. b) Check to see if your work will conflict with an existing modification or repair. c) Ask others if they can see any problem with the work done.

12. Norms

This last cause is a powerful one. Most people want to be considered one of the crowd and norms develop within such a group which dictates how they behave. The poster depicts an jet engine being installed with its pylon to the underwing of an aircraft. This is being done using a forklift and the caption says: "Never mind the Maintenance Manual. Its quicker the way we do it here." The safety nets offered are: a) Always work as per the instructions or have the instructions changed. b) Be aware that "norms" don't make it right.

WHERE CAN I GET THEM?

The dirty dozen posters are given free of charge as the cost to develop and print them was borne by the companies whose logos appear at the bottom of each poster. We ask each recipient for a donation towards a poster fund to be used to print a similar set for ground crew. To date 1,000 sets of these posters have been given out to aviation companies all over the world. A second run has just been completed and is available by contacting myself at:

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Only by training and constant awareness can we hope to avoid the dirty dozen and their consequences.

MR. GORDON DUPONT



Gordon Dupont is interested in any work which will serve to make aviation safer. He has been a member of several aviation organizations and was the first president of the Pacific Aircraft Maintenance Engineers Association. He has been an Aircraft Maintenance Engineer and commercial pilot in Canada, the United States and Australia. He has also worked as a school teacher, principal of the Pacific Vocational Institute, Chief Engineer for Crown Forest Industries and Technical Investigator for both the Canadian Aviation Safety Board and the Transportation Safety Board. Since March 1993, he has been the Special Programs Coordinator for Transport Canada System Safety, developing and presenting programs such as Human Performance in Maintenance.
