

# GroundEffects™

Reporting Maintenance and Groundcrew Error Reduction Efforts

Fall 2000  
Volume 5 Issue 3  
\$10.00 per issue

Website:  
[www.marss.org](http://www.marss.org)

**Editors Note:** This article first appeared in the March 2000 issue of AMT magazine and is reproduced with the permission of AMT magazine.

"Since the publication of this article, the CARAC Technical Committee has accepted the human factors training, Quality and Safety Program and the accountable executive regulatory proposals. To support the implementation of these requirements we will be producing guidance material and, in the case of the safety management requirement, will be assisting the System Safety Branch in the development of a training program to facilitate the industry's implementation of this regulation.

In regards to human factors, we have produced an airworthiness notice that will provide guidelines for the human factors training requirement. In addition, Transport Canada has committed resources to host the 17<sup>th</sup> Annual Human factors in Aviation Maintenance Symposium. The year 2000 conference, held in Vancouver, attracted four hundred delegates and provided a wealth of human factors related information to the attendees.

## Managing Safety: A Canadian Perspective

Much has been said in the past few years about the role of the "human factor" in maintenance error. Statistically speaking this attention is warranted given that the percentage of incidents attributable to mechanical failures are declining, whilst incidents attributable to human performance are increasing. In the man versus machine interface, mankind is definitely becoming the more unreliable partner. Indeed, the increased confidence in the reliability of the machine, has placed the focus for improvements in safety squarely on the shoulders of the human element. With this increased awareness and the abundance of literature available, neither

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## Help for Shiftworkers

Shift workers and their families don't have it easy but it is a fact of life for many people who work in aviation.

We have come upon an organization that is dedicated to assisting all shift workers of all walks of life. They have an excellent website and offer FREE a monthly email outlining what is happening in the field of research regarding shift work. The website is [www.circadian.com](http://www.circadian.com). They have a wealth of information and are willing to share it as well. The more we understand the



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*GroundEffects™ would like to extend our thanks to the following companies for their generous contributions.*



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## Help us to prevent accidents before they happen!



**GroundEffects™** (ISSN 1094-0146) is the official newsletter of **MARSS (Maintenance and Ramp Safety Society)** and is published four times per year to discuss issues affecting maintenance safety. We offer practicable solutions to maintenance managers, regulatory authorities, and unions charged with improving safety and reducing costs.

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companies nor regulators can afford to ignore the impact that human performance has upon aviation safety. If we bring technology into the equation, and mix in the increasing complexity of aircraft, the need for addressing human factors within aviation safety becomes vital.

Since the 1989 crash of flight 1363 in Dryden, Ontario, Transport Canada has tried to address the issue of the “human factor” head on. Indeed, the subsequent Moshansky Commission of Inquiry resulted in numerous human factors recommendations, many of which are reflected in the new Canadian Aviation Regulations (CARs).

In introducing the concept of human factors as an integral part of the safety regulations, we have been careful to avoid the “knee jerk” reaction that an accident such as Dryden can have on the regulatory regime. Whilst avoiding the urge to be prescriptive, we have also attempted to integrate a pro-active approach to safety through built in countermeasures.

If we consider the twelve most common influences affecting human performance which include: fatigue, stress, and a lack of knowledge and then look at Subpart 573 of the CARs - Approved Maintenance Organizations, it is clear that we address many of these issues in a dynamic, yet flexible way.

To demonstrate this, let's take a closer look at the human factors countermeasures we've built in to the regulations as a buffer against a lack of knowledge. Lack of knowledge, a common and understandable problem, particularly with new employees and apprentices, also affects seasoned maintenance professionals, especially when new products and procedures are introduced into a company. CAR 573.06 makes provision for all of these circumstances by requiring that Approved

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**"We often discover what we will do, by finding out what we will not do."**

*- Jacqueline Booth-Bourdeau*

Maintenance Organizations implement a training program that ensures all employees, who perform or supervise maintenance, receive training in the procedures applicable to that function. Standard 573 of the Airworthiness Manual details the type of training that must be

given: initial, recurrent and update training.

To ensure that maintenance personnel have the necessary training to competently perform their duties, CAR 573.09 requires that an AMO establish a quality assurance program. The goal here is to make sure that personnel have sufficient knowledge to ensure the correct performance of critical maintenance tasks. Where weaknesses are identified, the CARs require that additional training be given.

Whilst this is a good start we realize that there is more work to be done. To this end we are in the process of introducing the requirement for all personnel with technical responsibilities to have initial and recurrent human factors training. Of course, human factors training and awareness is not the end of the story; nor is government regulation. It's our firm belief that for any human factors program to be successful there has to be a commitment at the management level to implement the changes necessary to improve safety. It's one thing to ensure that all of your employees have human factors training; it's another thing to implement a safety program in which human factors is an integral part of the way you do business. Without the attendant safety culture that's essential to all successful safety programs, the benefits of human factors interventions on the shop floor will simply be lost.

We realize of course that a "safety culture" is not something that can be regulated. As a government agency we can, however, provide the framework, which if applied correctly, will lead to its development. In conjunction with the human factors training requirement we will be submitting a Notice of Proposed Amendment (NPA) to the CARs providing for the implementation of a Maintenance Safety Program in all AMOs and Air Operators with ratings in the Transport and Commuter categories. The concept is not new in Canada, there is an existing requirement in the operations side of the house. This NPA merely extends the requirement to cover maintenance, thereby completing the safety management picture.

In brief, this regulation will require organizations to conduct a hazard analysis of their procedures, conduct on-going safety audits, provide error analysis and information feed-back, and communicate safety

findings within the workplace. To reinforce the importance of the role of management in setting the level and tone of safety within the company, the certificate holder or accountable executive is responsible for the program.

In the ten years since Dryden we've come a long way towards recognising the importance of human factors in aviation incidents. Moreover, we have recognised that addressing individual human performance is only one piece of the safety puzzle. Without the commitment of the entire company to make safety, and not economics, priority number one, classic human factors interventions that empower and educate the AMT will continue to be diminished. We have also realized that aviation safety cannot be assessed from a singular perspective; maintenance is just one of the links in the chain of events that lead to aviation incidents.

Error is a natural human tendency; "recognizing the fallibility of humankind is just another foreseeable hazard in aviation." The issue is not why the error occurred, but how it failed to be corrected. As the author Samuel Smiles once said:

**"We often discover what will do, by finding out what will not do; and probably he who never made a mistake never made a discovery."**

The point here is that we need to learn from our mistakes and implement the measures

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(Con't from page 3,  
Managing Safety ...)

necessary to reduce human errors in maintenance. We have to recognize the types of mistakes being made and develop countermeasures to prevent their reoccurrence. In some cases this might involve a real commitment on the part of management to radically change the organizational factors that create the latent conditions that lead to error. Whatever the solution is, it's becoming clear that the only real way to achieve a reduction in the rate of accidents and incidents, is to address the prime cause - the human factor.



**Jacqueline  
Booth-Bourdeau**

Jacqueline Booth-Bourdeau is a Technical Program Manager with Transport Canada's Aircraft Maintenance and Manufacturing Branch. She is responsible for human factors and safety issues affecting aircraft maintenance. Jacqueline holds Bachelor's and Master's degrees and is currently studying aviation safety and quality assurance.

**Editors Note:** We can never get enough training! Now with free on-line aviation maintenance courses, learning has become a whole lot more convenient.

## FREE ONLINE COURSES OFFERED TO AVIATION MAINTENANCE PROFESSIONALS

Ronald Reagan was only half right! There may be "no free lunch," but there is free learning - at least for the aviation maintenance industry. A new Internet company - Aerolearn.com - is offering over 200 courses designed specifically for aviation maintenance technicians, engineers, and managers.

Each course is available at anytime from anywhere - completely for free. Dr. Amir Moghadam, the president of Aerolearn.com, explained, "Adult learners may face major family responsibilities and time constraints. We offer short courses that are designed to give the essential information on a specific topic. You might call it 'byte-sized' learning, on a need-to-know basis." Moghadam, who earned his Ph.D. in Aeronautical Engineering at Cambridge, also serves as the president of Northrop-Rice Aviation Institute of Technology. Aerolearn is his dream and passion. "I wanted to create a free online learning community for aviation maintenance professionals," he says. "We believe that the people with the 'right stuff' are the people who make sure all the 'stuff' works right."

Aerolearn's curriculum covers a wide range of subjects, including both technical courses and management topics. The courses are written by instructors representing every segment of the industry. "Learning from each other - from the shop floor to the top floor - that's our concept," explains Dr. Lou Tharp, Aerolearn's Director of Online Learning. "We believe that everyone has something to learn and something to teach others. Aerolearn.com is a free knowledge hub created *for and by* industry professionals."

Some courses have been developed by aviation maintenance educators, such as Professor William Watkins from Purdue University, recently named "Aviation Maintenance Educator of the Year." Many courses come from industry experts. Some courses have been developed from presentations made at conventions of major aviation associations such as PAMA and ATEC. There are some highly technical courses such as "TFE751 Engine Troubleshooting" developed by Tom Bert and Doug Alleman from Duncan Aviation or "APU Maintenance" presented by Tim Coggin of Standard Aero. Bob Jones from Aircraft Technical Publishers offers a course on the newest advances in "Electronic Logbooks." Phil Lomax, Aviation Safety Inspector for the FAA, has a course entitled "Inspect for Airworthiness."

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(Con't from page 4, Free Online...)

Management and leadership topics are also a major focus on Aerolearn's online campus. There are dozens of courses on subjects like communication, delegation, teamwork, budgeting, motivating employees, etc. Leonard Javinett from Pratt & Whitney offers a course describing P&W's ACE Initiative program for competitive excellence. The instructor for several Human Factors courses is Richard Komarniski, president of Grey Owl Aviation Consultants. One of several career development courses was written by Dr. John Mattei, who developed his own career from A&P technician to Chief of Operations for Skylab. "My job is to bring together some of the most knowledgeable people in the profession as our online instructors," explains Dr. Tharp. "We are just getting started. We welcome new courses from aviation maintenance professionals who wish to share a part of their expertise with the community."

Each course has an instructor who is available to answer questions and to preside over the discussion forums in which the students can interact with each other. Each course also has its own private chat room, equipped with an online whiteboard on which students can make interactive drawings. There are "External Links" and "Resources" buttons that lead the student to related websites for further learning. Many of the courses have computer-graded quizzes so that students can assess their own progress.

The Internet is revolutionizing the learning process, explains Dr. Moghadam. "The beauty of online learning is that every student can choose exactly what fits their interests and learn at their own pace - and their own place, at work or at home, in a few minutes of spare time." The entire aviation maintenance community can access Aerolearn.com courses - worldwide.

Free online courses, available 24/7/365, and accessible worldwide - it sounds too good to be true. "Everyone asks us the same question, says Dr. Moghadam, "What's the catch?" His answer: "There really is no catch. The idea is simple. The business community sponsors many of our courses to allow us to offer them for free. Many aviation corporations are very interested in continued learning and this is a way they can help insure a better-educated workforce. It's a win-win for everyone!" To make it win for you, just enter their campus at [www.aerolearn.com](http://www.aerolearn.com) - and start learning.



**Dr. Lou Tharp**

**"We believe that the people with the 'right stuff' are the people who make sure all the 'stuff' works right."**

**- Dr. Lou Tharp**

Dr. Tharp graduated *magna cum laude* from Yale University where he was captain of the debate team and class orator. He earned his M.A. and Ph.D. degrees in psychology from Claremont University. He has a wide range of experiences that include work as a professor, instructional designer, author, psychotherapist, and video producer. Dr. Tharp has conducted personal development seminars for employees at McDonnell Douglas, the FAA, and other organizations. He is the producer of several educational television shows and has done extensive research on the process of learning.

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## 15 Symposium on Human Factors in Aviation Maintenance

*(Con't from page 1, Shiftworkers)*

This annual event supported by the CAA, FAA and Transport Canada is scheduled for March 27 - 29, 2000 at The Brewery Conference Centre in London, UK. The event provides a unique opportunity to gain an insight into the latest developments on Human Factors in Aviation Maintenance. In March 2001 it will be hosted in London by CAA, and will attract a wide international audience particularly from Europe, Asia and the Far East.

While human factors problems still exist, much work has already been done towards providing solutions. Changes to ICAO Annex 6, and new proposals to amend JAR 145 have increased the urgency to start applying good human factors principles in aviation maintenance. This symposium is designed to assist the maintenance community apply those solutions and best practices.

The programme is a mixture of presentations by the principle regulators and experts in the field, and a series of interactive sessions. The sessions are designed to provide practical advice and guidance with the opportunity to discuss and debate the issues.

The programme will open with a series of presentations covering such issues as:

- Proposed changes to JAR 145 to address human factors
- Up-dates from the regulators on their efforts in research, education, and rule-making
- New research material
- Making aircraft maintenance friendly
- The role of Human Factors in Safety Management

Speakers are all leading figures in the field and will include Professor James Reason, Manchester University, Dan Maurino, ICAO and Jean-Marc Cluzeau, JAA.

problem, the better we will be at dealing with it. I recommend that you check it out.

They have also developed a calendar for the shift worker. It is an excellent tool to assist the worker to communicate with their family as it comes with stickers to put on each month to show what shifts and when the worker will be on. One glance at this calendar and the family knows that: "Dad will be trying to sleep on this day after midnight shift so I better not have my noisy friends over." This can not only help improve morale but helps educate the family. It also offers very valuable tips to the worker on how to reduce the stress of shift work. It does this very effectively by using cartoons to get the message across. To see an example of the calendar check out [www.wnfamilycalendar.com](http://www.wnfamilycalendar.com).

If use of this calendar can prevent just one error on a night shift it will have paid for itself and a lot more. We have to use all the tools available to us. Check this one out.

### **Please Note:**

At the November board meeting it was decided that the cost of GroundEffects be increased for non-members from \$8.00 per issue to \$10.00 per issue including postage and handling. The good news is GroundEffects is still included free with your membership. So why not join us!

**Editors Note:** Over two months ago I asked Transport Canada in Ottawa for an article outlining its Human Performance in Aircraft Maintenance Human Factors Workshop. I was promised the article a few weeks ago but have not yet received it and due to the deadline for this issue of GrounEffects, I could no longer keep waiting and asked Mr. Gordon Dupont, System Safety Services CEO, to provide the article.

## **Human Performance in Aircraft Maintenance (HPIAM) Transport Canada's Human Factors workshop**

On September 8, 2000, Transport Canada Aviation (TCA) issued an Airworthiness Notice numbered B058, entitled; "Guidelines for the introduction of human factors training requirements into the Canadian Aviation Regulations (CARS)." In this notice, Don Sherritt, Director of Aircraft Maintenance and Manufacturing, outlined the upcoming requirement for human factors training for "all employees with technical responsibilities."

This in response to:

- a) The International Civil Aviation Organization (ICAO) amendment to Annex 6 and
- b) A recognized need to reduce maintenance error.

It is interesting to note that computer based training (CBT) will not be accepted for the initial training. While the notice does not specify the required time for the training it suggests that one-day would be considered the absolute minimum.

To this end Transport Canada (TCA) has developed a two day human factors workshop entitled Human Performance in Aviation Maintenance. This workshop was presented to the public at the 14<sup>th</sup> Symposium on Human Factors in Aviation Maintenance, in March 2000 at Vancouver BC.

### **A Little History**

On March 10, 1989, a Fokker F-28 crashed in Dryden Ontario with a loss of 24 lives. An exhaustive commission of inquiry lead by Justice Moshansky resulted in almost 200 recommendations, most of which were aimed at TCA as the regulatory body responsible for ensuring aviation safety within Canada.

In 1993, TCA hired Gordon Dupont, as a Special Programs Coordinator, to develop and deliver a human factors program for aviation maintenance personnel. In close cooperation with all segments of the aviation industry, a two-day workshop entitled Human Performance in Maintenance (HPIM Pt. 1) was first delivered in late 1993. It was designed from scratch with the input of the industry committee members and help from Continental airlines who were deliver-

ing a workshop entitled Crew Coordination Concept. The industry committee recognized that the training must be on going and in 1996 the two day HPIM Part 2 workshop was introduced. As a follow up to Part 1 the 12 series posters entitled, "The Dirty Dozen" were printed by the aviation industry group with industry funding. A similar set of positive posters, promoting the maintenance person as a professional was produced as a follow up to Part 2. HPIM Part 3 was not completed prior to Gordon leaving TCA in 1999.

### **The Development of HPIAM**

In August 1998 TCA, Ottawa, met to review the HPIM, now in use by all major and regional airlines in Canada as well as some outside the country, with the intent to update the material and provide the completed product in both official languages (English and French). The completed product would be an official Government publication and have a TP# (Transport Publication#). HPIM was considered a "regional" initiative and had not been officially recognized by Ottawa (TCA headquarters). It was also available only in English.

Gordon Dupont was an initial member of the group but the industry was not to be included in the development of a product they would be encouraged to use. An industrial psychologist was included in the team as were TCA maintenance safety officers from across Canada. An evaluation run of HPIAM was

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(Con't from page 7, HPIAM)

carried out in January of 1999 and it was decided, as a result of the industry evaluation, to rework several modules. A second industry evaluation produced better results and HPIAM was formally introduced to the industry at the 14<sup>th</sup> Symposium.

## What Changed?

- A review of HPIM resulted in the following guidelines.
- The new HPIAM would utilize the “Dirty Dozen” as the basis of the workshop.
- Parts of Part 1, Part 2 and Part 3 would be combined in HPIAM.
- The “Behavioural Analysis” would be dropped as it was considered a “Pop Quiz”.
- The “What Determines a Person’s Characteristics?” was also dropped as it was considered based on unproven and old theories.
- The module “Characteristics of an AME” was dropped as being too negative and tending to stereotype the participants.
- All case studies were also changed.

The entire workshop was made “politically correct”. For example: The November issue of Playboy in the survival exercise was replaced with; “A copy of the latest issue of Macleans”. The remaining 14 items remained the same.

In place of some of the above, a module entitled “Human Error” was added.

## The Contents of Human Performance in Aircraft Maintenance (HPIAM) Workshop

HPIAM (TP 13459 E or F) comes in an English or French version but not both in the same package. It is very professionally packaged in a one-inch binder that has a pocket in front for the TCA video (TP 13459 E or F (V)) “Human Performance in Aviation Maintenance Workshop Video”. This is a high quality video that includes the training video “Human Factors in Aircraft Maintenance” as well as several of the skits that used to be delivered by the facilitators. The workbook is divided into 15 tabbed chapters and has 68 numbered pages for the first day and 84 pages for the second day. Each page has a miniature version of the PowerPoint slide as well as a place for notes and in most cases some written commentary. At the end there are numerous pages of information under recommended reading. Embedded into the inside back of the binder is a CDROM (TP 13459 E or F) 05-JAN-00. This CDROM contains 18 objects and is 391 MB in size.

Here is a quick review of the 15 chapters starting with:

Day one.

- 1) Introduction - Pages 3 to 10. An introduction giving the working agreement, workshop outline, workshop objective and an

**The entire workshop was made “politically correct”.**

**- Gordon Dupont**

explanation of a safety net and link in the chain of events.

- 2) History – Pages 11 to 16. An understanding that about 80% of aviation accidents are Human Error verses 20% Machine Error. The history of Human Factors training beginning with United Airlines Flight 173, Aloha Flt. 243 and ending with Air Ontario Flt. 1363. The Heinrich Ratio, maintenance error is not the cause etc and benefits of human performance training round out the history chapter.
- 3) Human Error – Pages 17 to 26. This chapter breaks performance into: a) conscious and b) automatic. It then uses a Human Reliability Associates model based on work by Jim Reason and adds a rule based block between conscious (now referred to knowledge-based) and automatic (now referred to as skill based). Types of errors are then covered and the chapter is concluded with the “Terrible Odds” exercise. This exercise, developed for HPIM Pt. 3, was featured in the GroundEffects - Volume 4 Issue 2 (Summer 1999) issue. Based on Jim

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*(Con't from page 8, HPIAM)*

- Reasons nut and bolt example, it illustrates how only 8 nuts and 8 washers on a bolt can be installed only one correct way but incorrectly installed almost 1.5 billion ways.
- 4) The Dirty Dozen – Pages 27 and 28. The 12 contributing factors to maintenance error are introduced.
  - 5) Survival Exercise – Pages 29 to 36. Notes for the “Lost on the Pacific Coast” exercise are here.
  - 6) Teamwork/Communications - Pages 37 to 52. Defines teamwork and offers strategies for an effective team. Defines communication, methods of communication, filters and offers ways to reduce the errors.
  - 7) Shift Change Exercise – Pages 53 and 54. Uses the shift change exercise, taken from HPIM Pt. 2, to demonstrate how difficult good written communication can be.
  - 8) Assertiveness/Case Study:MD369 – Pages 55 to 68 Assertiveness is covered and related to the balance of the dirty dozen. The results of the survival exercise are now shown and a helicopter case study rounds out day one.

## **Day Two**

- 9) Fatigue/Stress/Distractions – Pages 3 to 30. Covers fatigue (pages 3 to 15), stress (pages 16 to 25) and distractions (pages 26 to 30) explaining what they are and what they do to cause maintenance error.
- 10) Case Study: Human Performance in Maintenance – Pages 31 to 36). Case study reviewed as well as safety nets for fatigue, stress and distraction.
- 11) Lack of Awareness, Knowledge and Resources – Pages 37 to 46. Discusses the three above mentioned “lack ofs”.
- 12) Case Study: F-28 – Pages 47 to 54. The case study of the Dryden accident is used and follows with the safety nets for the three “dirty dozen” discussed in chapter 11.
- 13) Pressure/Norms/Complacency – Pages 55 to 76. Offers explanations and safety nets for the three items.
- 14) Case Study: Boeing 737 – Pages 77 to 84. Uses the Aloha accident as a case study and concludes with the “What is the key to Safety?” wrap up of the workshop.
- 15) Recommended Reading: Historical Case Studies – Pages 1 to 9. Provides a short recount of some of the world infamous accidents such as the Challenger, and Chernobyl. It has an excellent 1½-page list of Email addresses where more human factors information may be found. It concludes with the all important evaluation sheet and a copy of “Shift Wise” – a 1993 TCA manual for its shift workers. Some of the information may be outdated but it is an excellent booklet full of information that is still useful.

## **A Note on Copyright**

As this workshop was developed solely by Transport Canada, it has been copyrighted and the following warning will be found in three places in the manual and on the CDROM.

“This publication may reproduced without permission provided that its use falls within the scope of fair dealing under the Copyright Act and is solely for the purposes of private study, research, criticism, review or newspaper summary. The source must be fully acknowledged. However, reproduction of this publication, in whole or in part for purposes of resale or redistribution requires prior written permission from the Minister of Public Works and Government Services, Ottawa, Canada, Canada K1A 0S5”

I believe what this means is; if you want to use it you must get written permission from Ottawa and you cannot change anything again without their written permission.

## **What does it Cost?**

The cost is very reasonable considering the professional manner it is presented in. The cost including the GST tax is \$107.00 Canadian. (In US dollars that equates to about \$1.75 –Joke... about \$70.00 but the government can only accept Canadian funds)

## **How do I order a copy?**

Now that is very easy. Log on to the website <http://www.tc.gc.ca/aviation/activepages/pubs/result.asp>

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(Con't from page 9, HPIAM)

## Careless, Stupid, Dumb and Lazy A New Video Coming

Order TP 13459 and the letter E for English and F for French.. The title of the publication is Human Performance in Aviation Maintenance – Instructors Guide.

You can fax (613) 957-4208 or Phone 1-800-305-2059 or (613) 993-7285 You can also mail to Civil Aviation Communications Centre (AARA)  
Tower C, Place de Ville  
Ottawa, Ontario  
K1A 0N8

Payment can be made by cheque or money order payable to Receiver General of Canada or by credit card – Visa or Mastercard.

If you'd like more information the most experienced person presenting this workshop is: Will Boles, Transport Canada Civil Aviation Safety Inspector, Ontario Region. He can be reached via Email at bolesw@tc.gc.ca His phone number is 416 952-3858 and fax is 416 952-0179. If Will doesn't have the answer, he sure knows how to get it.

Human Factors training for maintenance personnel is about to become a world wide requirement. Here is one version that for a reasonable price, will enable you to look at what a human factors workshop can look like. Check it out.

*Gordon Dupont  
System Safety Services*

A new training video is being shot by System Safety Services with the title of "Careless, Stupid, Dumb and Lazy." These words were, unfortunately, very commonly heard after an error was made and an accident due to human error had occurred. Sometimes it was the person who had made the error that was using these words as he/she tried to rationalize how he/she had come to make what is being looked at as a simple error. Some would say, a careless or stupid error.

The intent of the video is to illustrate how the "Dirty Dozen" can all come together to contribute to a person's error in judgement or performance, the outcome of which is a maintenance error. In fact this video employs a "Bakers Dozen = 13 contributing factors. The 13<sup>th</sup> is "Early Life Decisions". These are the things we pick up as a very young child, that influence how we behave as an adult. A full explanation is given in the introduction.

The story line is simple enough. A ramp worker tries to drive a load of baggage under an aircraft and tears a hole in the belly skin as well as damages a former. The result is an expensive repair estimated at \$175,000.00 and 5 days of down time. The audience is challenged to see how many of the dirty dozen plus one, they can spot as they watch the video. A handout with the script conversation and underlined words assists the participants to write their answers down in a space provided.

The scene takes place in the office of Rodney Dontknow, the Ramp Manager of Low Cost Airlines. The guilty party responsible for the accident, Johnny Workhard, enters the office and meekly sits down. In the conversation, the viewers hear some of the contributing factors to Johnny's error in performance. A total of 15 indicators are presented in the conversation.

The next segment of the video provides the answers to the 15 links in the conversation. This is done by flashing back to the sentence that provides the clue and providing the answer it should have indicated. The video concludes with a team of industry experts discussing what safety nets might prevent a reoccurrence of the event or one like it.

It will be a short video that is intended to illustrate, among other things, how human factors knowledge can assist in finding the true reason why an event occurred. It will also be useful as a form of recurrent training.

It is estimated that the video will be completed in time for the 15<sup>th</sup> Symposium in Human Factors in Aviation Maintenance in March, 2001. Watch for the release date and availability in future GroundEffects.



## From The Editor!

Happy Holidays and welcome to the last edition of GroundEffects™ for the year 2000, Issue Number 18! This issue is dedicated Maintenance Safety in Canada. The first article Managing Safety: A Canadian Perspective written by Jacqueline Booth tells us what Canada is doing in the way of Human Factors training. It is a very interesting article especially for those of us here in the cold. One thing that Jacqueline says in her article that I found very interesting is, "We often discover what we will do, by discovering what we will not do." Isn't that the truth... On behalf of the Board of Directors for MARSS, I would like to thank Jacqueline for her informative article.

Again, we have another interesting article on Shiftwork. As mentioned in previous additions of GroundEffects, Shiftwork plays a huge part in Aviation Safety. Please read the short article and visit the website [www.circadian.com](http://www.circadian.com) to find out more about how you can put safety nets into affect if you are a shiftworker.

How many times in our lives have we said we do not have time for more schooling or training? Now there is no excuse. Free on-line courses are now being offered to Aviation Maintenance Professionals. What a wonderful step for us! Now there are no more excuses. With on-line courses, you can fit training around your schedule. Visit [www.aerolearn.com](http://www.aerolearn.com) and start learning today!

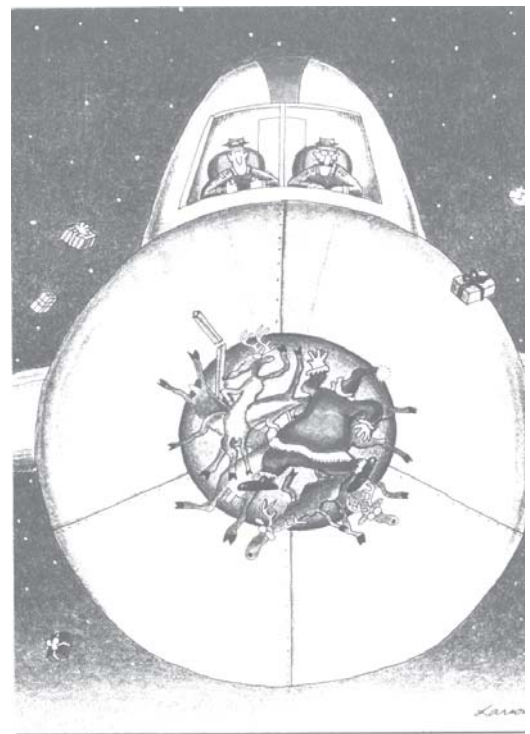
Transport Canada is going to now set the framework for companies to develop a Safety Management System which will require Human Factors Training. I was unable to obtain an article on their Human Performance in Aviation Maintenance (HPIAM) from Transport Canada Ottawa in time for this issue as it seems that they had too many editors (lucky people) editing the article and no one seemed to be able to finalize the article. I asked Gordon Dupont to write the article instead. It appears to be a worthwhile workshop that you can be sure is politically correct. The cost to buy the workshop is very inexpensive but be advised, it has been copyrighted and may not be changed or used without their written permission. For Transport Canada to do this it is almost like they are saying we now have a copyright on SAFETY. Buy and use exactly what we have developed only. In fairness they have not said use theirs only. At least not yet.

Human Factors training for maintenance personnel is finally coming of age. It's been a long time coming but Hooray it is finally here.

I would like to thank Gordon Dupont for his continuing support and very interesting article. Thanks Gordon.

On a final note, I would like to say **HAPPY HOLIDAYS** from myself and the Board of Directors for MARSS. I wish to thank all of you for your continued support through the years and ask that you send any ideas or thoughts that you might have to me. I would be happy to respond to your thoughts.

Enjoy the holiday season and remember to work safe. Accidents can be prevented!



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