

Safety in Aircraft Maintenance

**Train the Person to
Avoid the Error They
Never Intend to Make**

**Presented
for
Flight Safety Foundation
Corporate Aviation Safety Seminar
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**Presented
by
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Dupont**



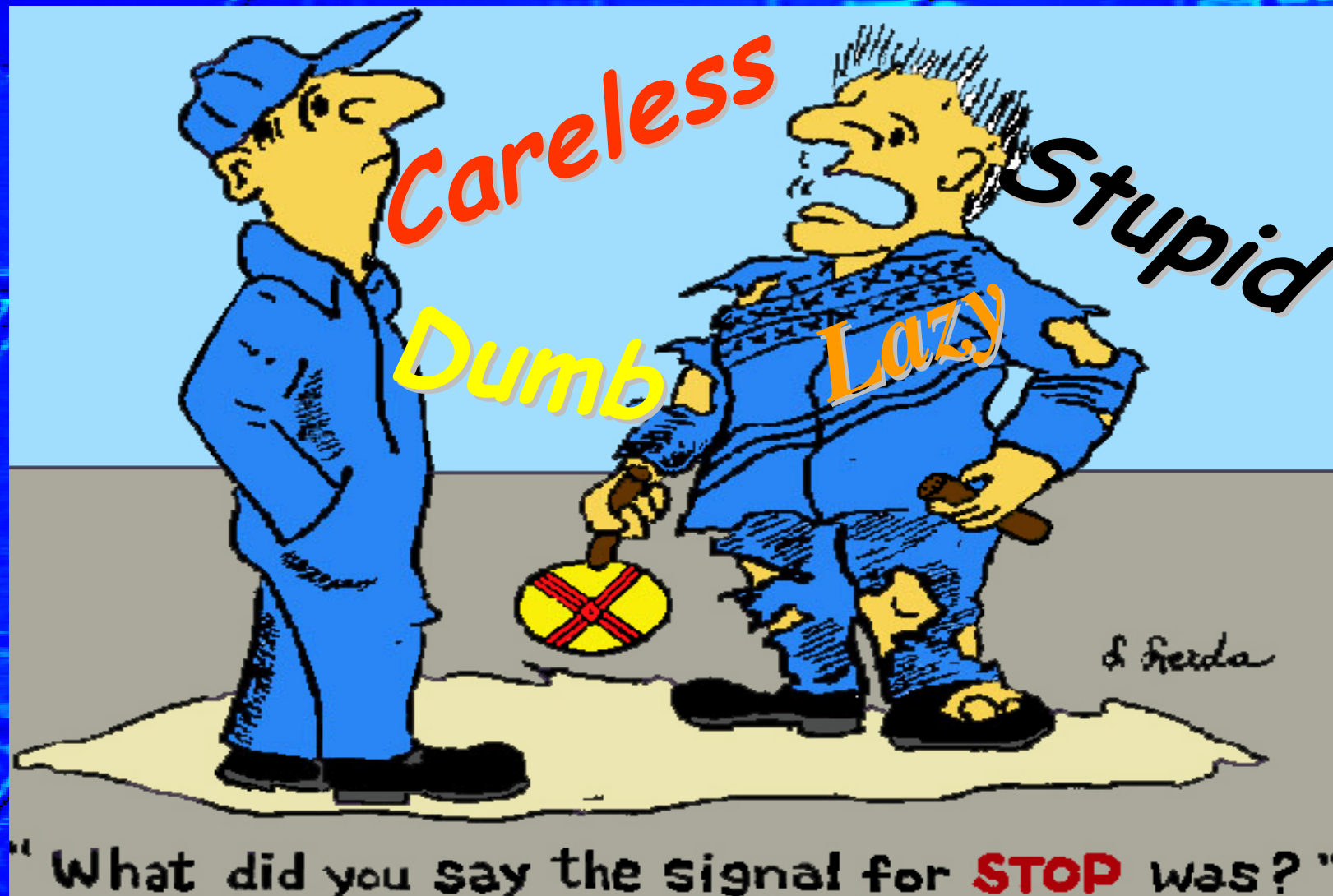
**We Humans Have Been Making
Human Errors For a Very long Time**



"That No Apple Policy doesn't
apply to us"

**And, Sadly, Will Continue To Do So
For a Very Long Time**

And When These Errors Occurred



We Would Say They Were:

We know:

Over 80% (plus) of our accidents are due to Human Error

These Human Errors are not made on purpose

Many of these errors are made by some of the best and most conscious employees

Thus something must have interfered with that “person’s” performance and/or judgment in order for the error to occur

[Maintenance] errors
are not the cause of accidents.
The causes are to be found in whatever
it was that interfered with the
[guilty party's]
{performance/judgment} at a critical
moment
the outcome (result) of which is a
[maintenance] error

Jerome Lederer
Flight Safety Foundation
Adapted by G. Dupont

Where Was Their Common Sense?



**Common Sense is Not That Common
And Has Nothing To Do With
Human Factors Training**

$$A + B = C$$

A. The Human is responsible for most of our accidents

+

B. He/she had no intention of making the error, then

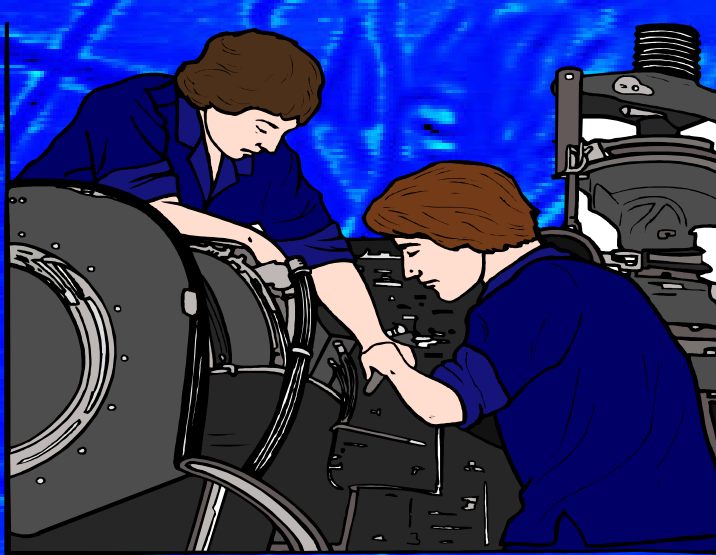
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C. It makes economic (and common) sense to train that person in how to avoid the error they never intend to make

So Why Don't We Train Everyone in Human Factors?

"They" don't want it

"We" can't afford it



AND



Besides no one has mandated it yet

Bull Pucky



ICAO (International Civil Aviation Organization) has dictated that ALL contracting states MUST provide human factors training to all maintenance personnel with signing authority in an AMO (Approved Maintenance Organization)

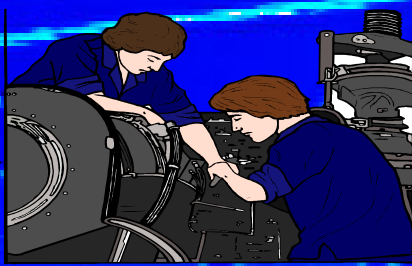


It has been a requirement in Canada since 1999



It will be a requirement in the USA one day

But it makes Economic Sense to train today



They Don't Want It

What we don't understand, we avoid

But they will want it if:

- ✓ a) The material is deemed to be useful

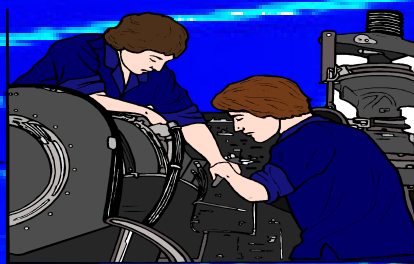
Useful?

Introduction	4-1
Joint Aviation Requirements	4-1
JAR-FCL and ICAO Annex 1	4-1
Medical Fitness	4-1
Requirement for Medical Certificate	4-2
Aeromedical Disposition	4-2
Decrease in Medical Fitness	4-2
Fitness to Fly	4-3
Blood Pressure	4-3
Hypertension	4-4
Orthostatic Hypotension	4-4
Causes of Orthostatic Hypotension	4-4
The Effect of G Forces on Blood Pressure	4-5
Donating Blood	4-5
Coronary Heart Disease	4-5
Atherosclerosis	4-6
Risk Factors for Coronary Heart Disease	4-6
Reducing the Risk of Coronary Heart Disease	4-7
Detection and Treatment of Coronary Heart Disease	4-7
Stroke	4-7
Anaemia	4-7
Obesity	4-7
Body Mass Index	4-8
Effects of Obesity	4-8
Exercise	4-9
Hypoglycaemia	4-9
Tropical Diseases	4-9
Vaccinations	4-9
Diarrhoea	4-10
Cholera	4-10
Typhoid Fever	4-10
Amoebic Dysentery (Amoebiasis)	4-10
Diseases Transmitted by Insects	4-11
Insects and Insect Vectors	4-11
Mosquito-Borne Diseases	4-11
Malaria	4-11
Dengue Fever	4-11
Diseases Transmitted by Flies	4-12

JAA ATPL Training Requirements

1. Separate Health & Safety from Human Factors

2. Train ONLY What They Can Use on the Hangar Floor to Avoid Making a Human Error

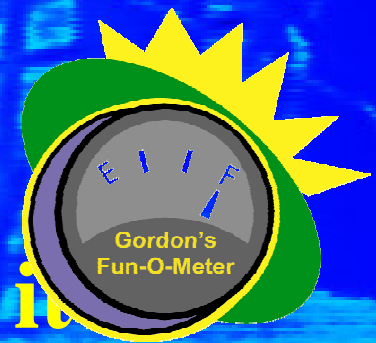


They Don't Want It

What we don't understand, we avoid

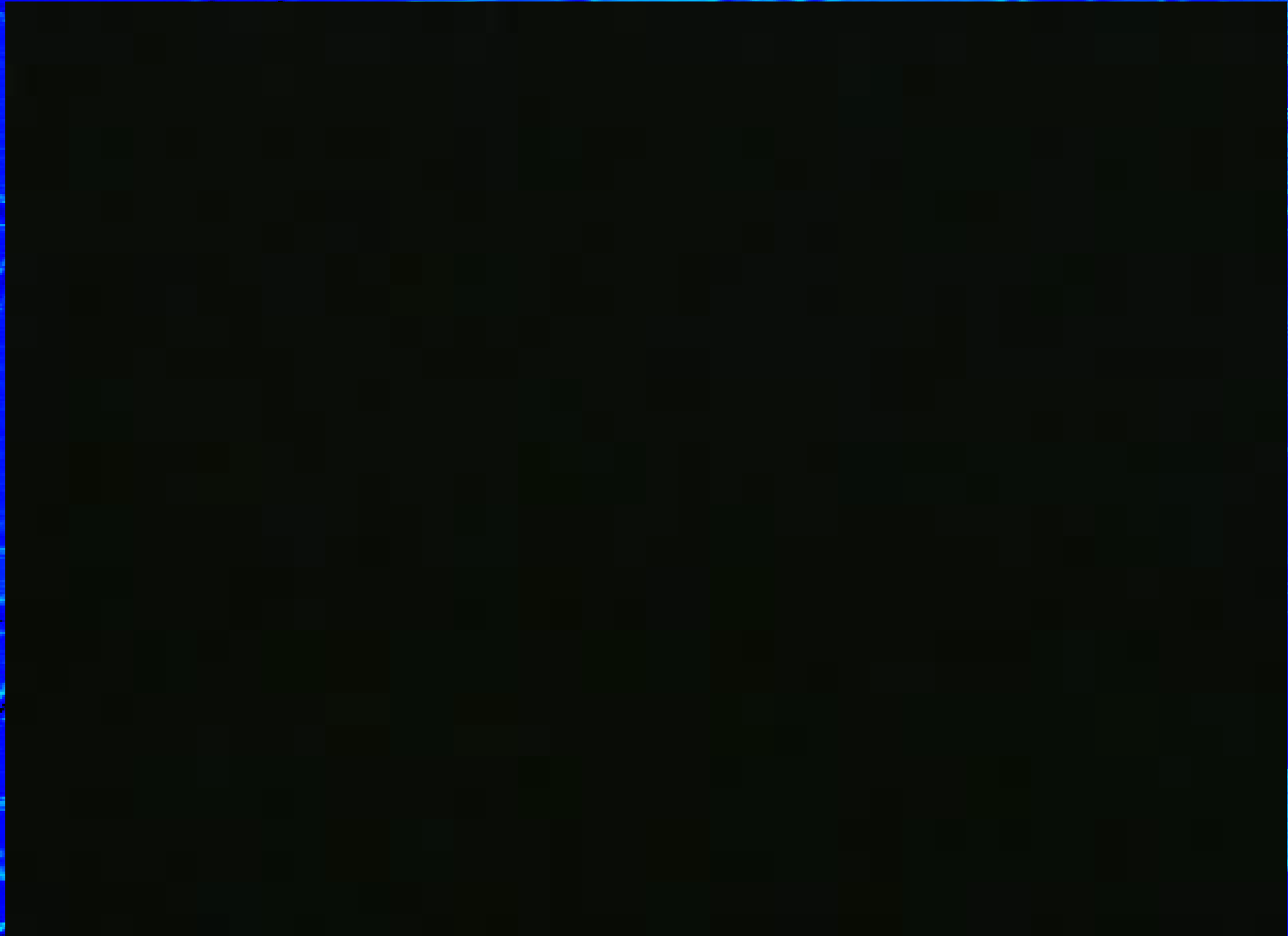
But they will want it if:

- ✓ a) The material is deemed to be useful
- ✓ b) The material has examples that relate to their work
- ✓ c) The facilitator believes and is passionate about the material
- ✓ d) The material is interesting
- ✓ e) The material has some Fun in it



For Example

STRESS AND THE LACK OF



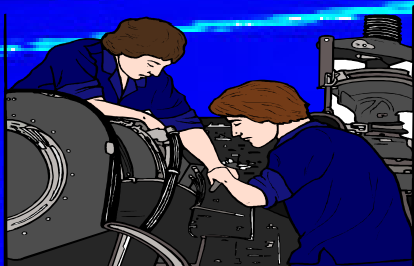


They Will Accept And Use The Training IF

- ✓ **f) It is based on PBL (Problem Based Learning) to the maximum extent possible**
- ✓ **g) It has follow up to help maintain awareness that the training will provide**

Follow up can be the following

- 1. Yearly ongoing workshops that build on the previous material as well as review**
- 2. A six month letter of Safety steps to be taken**
- 3. Weekly HF news short stories are useful**
- 4. A company newsletter devoted to HF**
- 5. Daily/weekly toolbox sessions**



They Will Accept And Use The Training IF

6. Follow up ‘Dirty Dozen’ Safety posters are put up one at a time and changed monthly

Maintenance Dirty Dozen

1. Lack of Communication
2. Complacency
3. Lack of Knowledge
4. Distraction
5. Lack of Teamwork
6. Fatigue
7. Lack of Resources
8. Pressure
9. Lack of Assertiveness
10. Stress
11. Lack of Awareness
12. Norms

The failure to ensure that the "Mental Pictures" match



Lack of Communication Safety Nets

These posters were designed in 1994 to be a follow up to Human Performance in Maintenance workshops. The BEST Safety Net for all of the Dirty Dozen is Human Factors training on how to avoid the error you never intend to make

Verbal

- Discuss work done and what has to be completed
- Paraphrase to ensure the "Mental Pictures" match
- Never assume anything

Written

- Check logbooks for snags or deferred items
- Write to insure the person reading will understand what to do
- Use simple, clear and concise language

Maintenance Dirty Dozen

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A loss of alertness and a feeling of tiredness that eventually ends in sleep



Fatigue Safety Nets

These posters were designed in 1994 to be a follow up to Human Performance in Maintenance workshops. The BEST Safety Net for all of the Dirty Dozen is Human Factors training on how to avoid the error you never intend to make

- Develop a routine for enough sleep & exercise
- Know the symptoms & look for them in yourself & others
- Use coffee or tea 30 minutes before needed
- Watch for the circadian rhythm low (3 to 5 am)
- Take the "Power Nap" when possible
- Drink lots of water

Maintenance Dirty Dozen

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The urgency of matters requiring immediate attention



Pressure Safety Nets

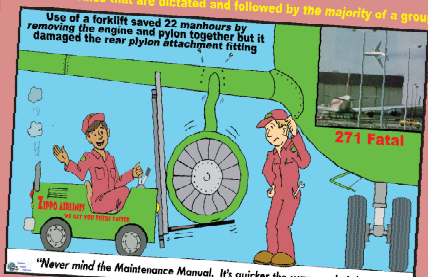
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- Know where the pressure is actually coming from & that it is not self induced
- Clearly state your case until there is a Safe resolution
- Saying NO for Safety is always an option
- Stop & look at the situation rationally before acting
- Ask for extra help
- Remember who will "Thank" you if you cause an accident

Maintenance Dirty Dozen

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Unwritten rules that are dictated and followed by the majority of a group



Norms Safety Nets

These posters were designed in 1994 to be a follow up to Human Performance in Maintenance workshops. The BEST Safety Net for all of the Dirty Dozen is Human Factors training on how to avoid the error you never intend to make

- Identify the negative norms (they detract from an established Safety Standard)
- Work to eliminate negative norms
- Refuse to participate in negative norms
- Always follow manufacturers procedures or have the procedures changed
- A professional doesn't take shortcuts
- Accentuate the positive norms





They Will Accept And Use The Training IF

7. They are provided decals and reminder cards that help keep the awareness level high




MOM'S ADVICE

STOP → Assess the situation.
LOOK → Rationally not Emotionally.
 → Look at reality
 → What's the worst that'll happen?
 → Can I change the situation?
 → How can I best cope?


LISTEN → To your Rational Mind.
 → Has this happened before?
 → What is the best Rational plan?

ACT → NOW!
 Repeat advice as necessary




DAD'S ADVICE

→ Think positive and positive things will happen to you.
 → If you want perfection, die and go to heaven but that doesn't mean you can't strive for it.
 → Anyone can make a mistake but only a fool makes it twice.
 → Anything worth doing is worth doing right.
 → Remember when you don't have time to fix it, you will when it fails.
 → Change what you can for the better and cope with the rest.





Just For Today
ATTITUDE HELPERS

→ Know your *child*
 → Control your *child*
 → Recognize the *child* in others
 → Develop an empathy for their *child*
 → Talk to your *child*




NORMS

→ Identify *pos* from *neg*
 → Accentuate the *pos* & eliminate the *neg*
 → Discuss and influence the group to change
 → Maintain your standard as a *professional*

MOM'S ADVICE

STOP → Assess the situation.
LOOK → Rationally not Emotionally.
 → Look at reality.
 → What's the Risk in what I am doing?
 → Can I change the situation?
 → How can I lower the Risk?
LISTEN → To your Rational Mind.
 → Has this happened before?
 → What is the best Rational plan?
ACT → NOW!
 Repeat advice as necessary



Risk Management

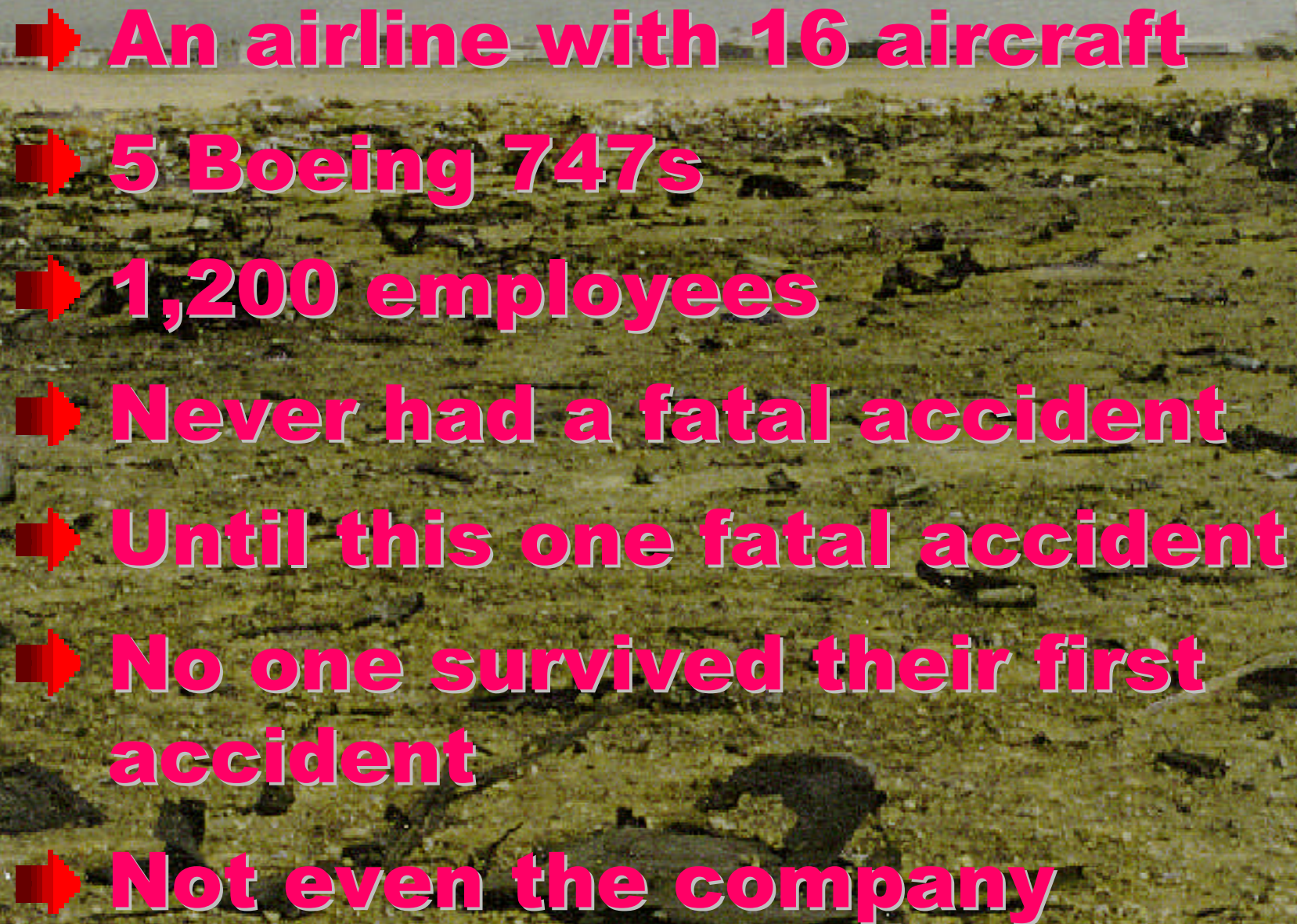
- IDENTIFY** We first have to be Aware
- ASSESS** We must analyze the risk
Frequency X Severity - Benefit = Risk Quotient
- CONTROL** Eliminate or Mitigate the Risk
- IMPLEMENT** Someone has to do it
- REVIEW** Monitor and improve if necessary or possible





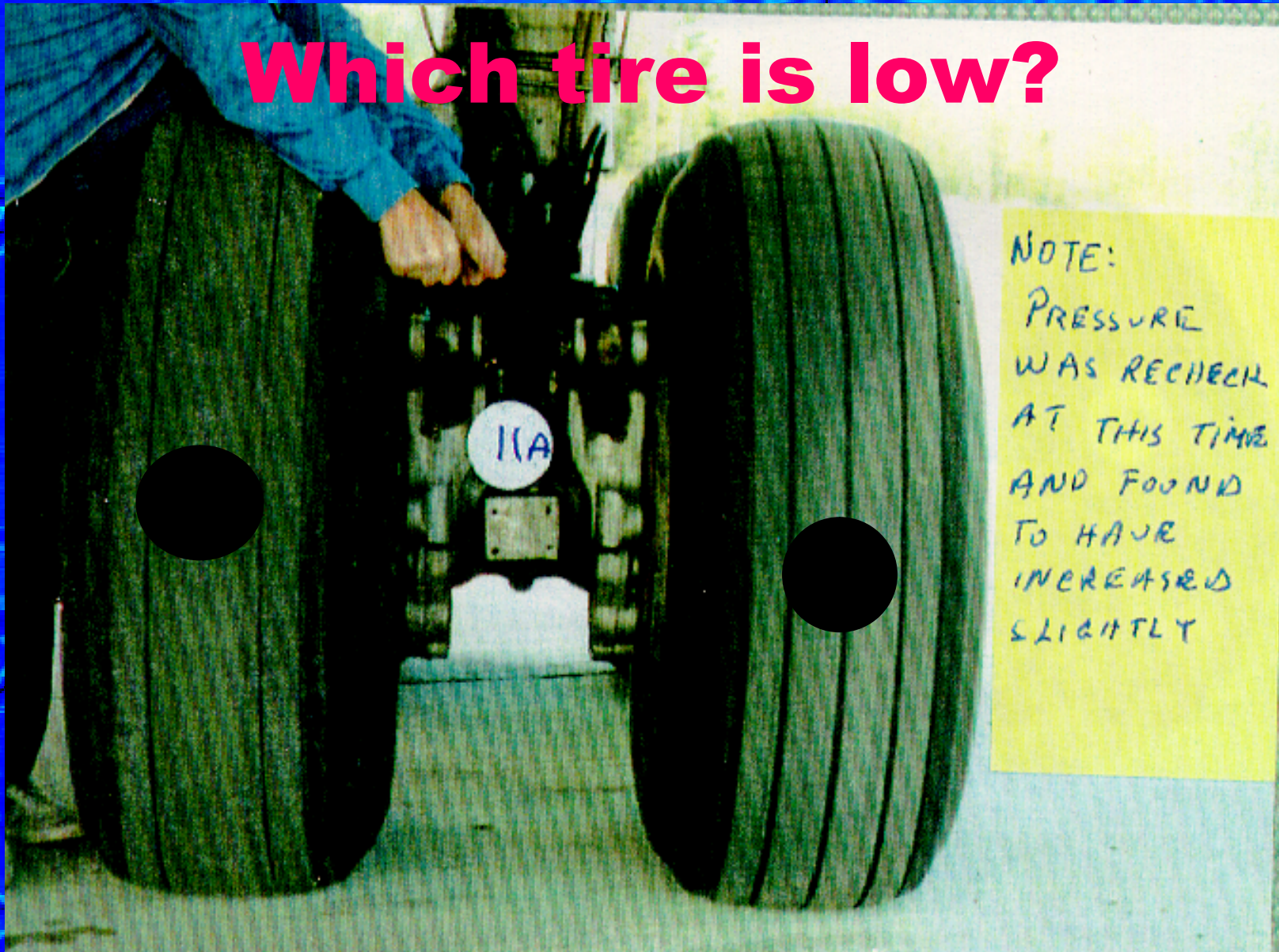
We Can't Afford It

- **You can't afford NOT to do everything you can to avoid an error that could result in the end of your company**
- **It only takes ONE human error**
- **For example:**

- 
- **An airline with 16 aircraft**
 - **5 Boeing 747s**
 - **1,200 employees**
 - **Never had a fatal accident**
 - **Until this one fatal accident**
 - **No one survived their first accident**
 - **Not even the company**

**261 persons died because one
tire was low on pressure**

Which tire is low?





You Can Afford It

The Benefits

- Demonstrates a commitment to Safety by being proactive ahead of a future Safety requirement
- Fewer maintenance and human errors
- Improved morale resulting in greater productivity
- Will help the implementation of a Safety Management System
- It is the morally right thing to do

A Case Study



The Result

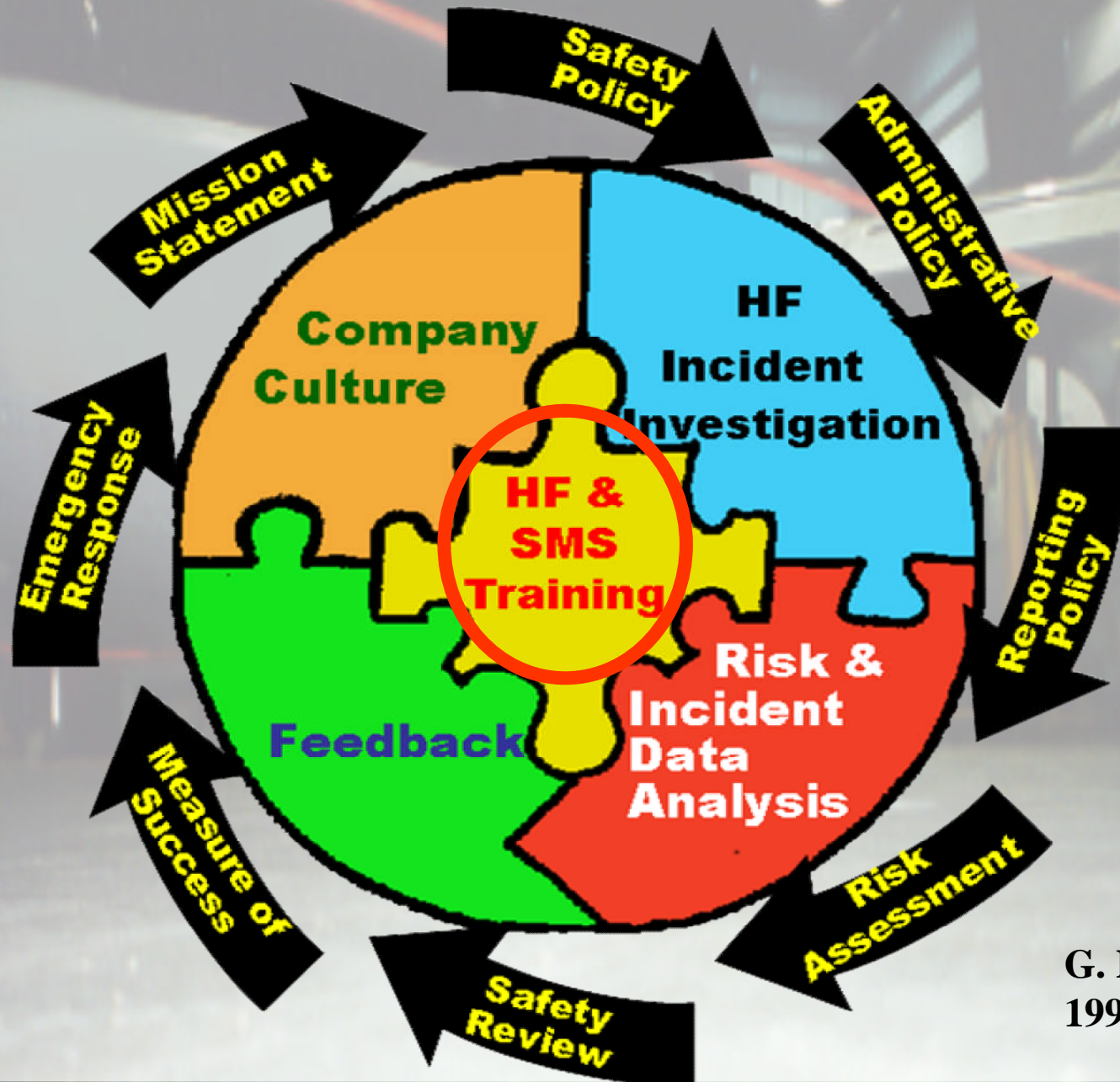
- 1. \$850,000 dollars worth of damage**
- 2. The two very experienced AMEs were fired for their carelessness**
- 3. One more very experienced AME quit in anger over the firing**
- 4. Everyone began to “work to rule” resulting in major delays in work being done**
- 5. One week out of service**
- 6. The morale was as low as the hangar floor**

Contributing Factors

Why did it happen?

- **Stress** - Worry about how long the strike would last and when they would be laid off
- **Norms** - The aircraft ALWAYS came from the ramp with gear pins installed
- **Complacency** - They had done this job many times before
- **Lack of Teamwork** - Each thought the other had checked for main gear pins installed
- **Fatigue** - They did the work between 0300 and 0500
- **Distraction** - They went for a coffee break just before the gear swing

The Big Picture SMS



G. Dupont
1995

Notice to Employees

National Transport Canada Audit

A Measure of Success

As many of you know, Transport Canada has just completed a full technical and operational audit. I am pleased to pass along their thanks to all employees who have been involved, for your hospitality, openness and positive attitude towards the audit and the Audit Team. They were impressed with response to questions and recommendations.

They have never seen morale so high

The Maintenance Audit Team remarked that they have never seen morale so high on a maintenance floor, and they are very encouraged by Maintenance Resource Management Program. = SMS

The Team also commended our airline for the professionalism displayed by flight crews they have met while in the field.

The audit provides us with a great opportunity to improve our processes and to identify areas of focus for our 1999 Operating Plan.

Thank you, again, for your cooperation and professionalism during the audit. Your attention to safety, every day, makes an audit a welcome event.

**= Less Human Errors and
Improved Productivity**

President and Chief Executive Officer

Its Just Common Sense

**Train the
person how to
avoid the error
they never
intend to make**

**They will thank
you for it**



Thank You For Your Time

Any Questions?



***No matter how right you are or hard you work,
sometimes the Maintenance Error Dragon still wins!***

Renee Dupont
System Safety Services