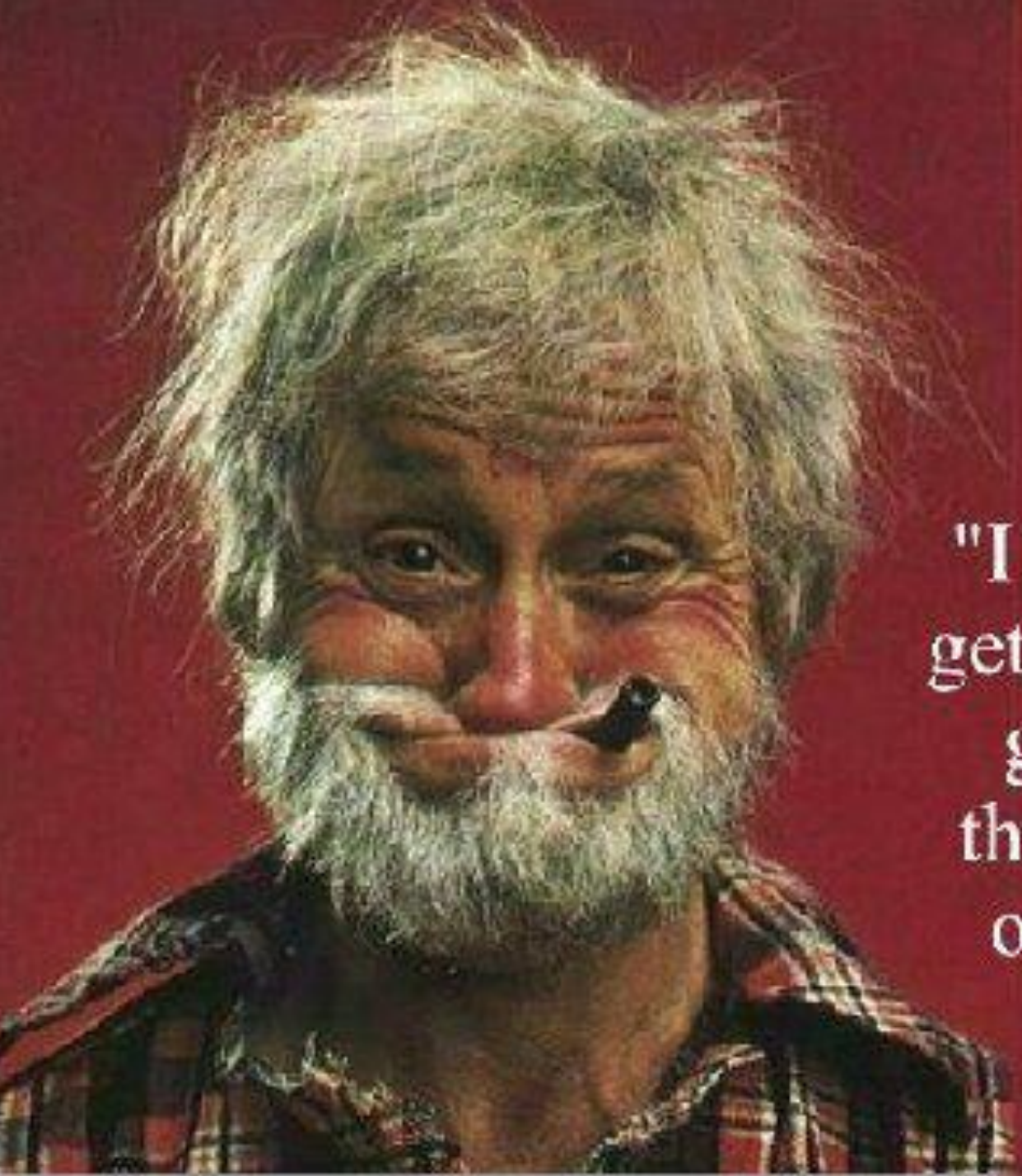


# Geezer Planet



"I don't think we  
get smarter as we  
get older. I just  
think we run out  
of stupid things  
to do."



# 405W Workshop Observations

- 1<sup>st</sup> workshop was interesting to observe in 5 dimensions:
  - **How well you mastered basic tool use (16/20)**
  - **How well you turned graphics & materials into objects (10/20)**
  - **How well you recognized issues of safety (10/20)**
  - **How well you divided tasks between people (16/20)**
  - **How well you worked as part of a team (14/20)**
  
- Use these introductory workshops to help you understand the areas you need to work on and how to master these basic tasks.
  
- Teams C and F this Thursday from 08:30-10:30 in ENSC Shop, ASB 8806A



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June 2018

# A Safety Primer for ENSC 405W

“There is nothing more uncommon  
than common sense.”  
– Frank Lloyd Wright



# We Are Not Good at Task Switching!





# Learning Objectives

- By the end of this module, you will understand **some** of the risk factors that relate to your personal safety at SFU.
- More broadly, why does safety matter to Engineers?
- As well, you will know a model for preventing accidents (**SLAPS**) and a model for developing situational awareness (**OOPS**)
- How to obtain permission to work with human subjects and how to deal with other potential risks.



# Workers Compensation Board & BC Engineers Code of Ethics

The first principle of the Engineers and Geoscientists Association of BC ***Code of Ethics*** reads as follows:

- **Hold paramount the safety, health, and welfare of the public, the protection of the environment, and promote health and safety within the workplace.**

The Workers Compensation Board of BC is concerned that this principle is not being emphasized in Engineering programs in BC. IMHO, that is an accurate assessment.



# Is Steve Accident Prone or Is His Behaviour Risky?

- 13 -- Missed shooting self in the foot (by one cm)
- 15 -- Mercury fulminate experiments (BOOM)
- 18 -- Electrocuted self (ALCAN)
- 19 -- Almost killed by an overhead crane (ALCAN)
- 19 -- O<sub>2</sub> bottle rockets (ALCAN)
- 22 -- Cliff climbing (RURPs)
- 25 -- Stuck hand in lawnmower (blades)
- 27 -- Tried to cut off thumb with a circular saw (kickback)
- 29 -- Stuck hand in lawnmower again -- sigh (flywheel)
- 30 -- Crashed car into bridge in snowy weather (speeding)

Analysis and evaluation of risk takes place in the frontal lobes of the brain, which continue to develop until about the age of 26-28.

Perhaps Steve is a bit slow in cognitive development :-)



## Don't Kick the Bucket!

A recent safety inspection of an SFU building discovered this hazard. The bucket was placed there to help people avoid slipping on water dripping from a leaky roof. In turn, the bucket became a tripping hazard. (Dec. 2016)

How could this situation be resolved?

**Take home exercise:** How many potential safety hazards can you find at SFU in the next week?







# 25+ Causes of Accidents

## 1. Acts:

- a) Violation of health and safety rules
- b) Disregard of hazard

## 2. Environment or Condition:

- a) Improper working conditions
- b) Poor housekeeping
- c) Poor workplace layout, walking space
- d) Improper planning
- e) Inclement weather (wind, rain, snow, ice)
- f) Conditions where repeated exposure could lead to physical impairment (hearing loss, arc flash, asbestosis)



### **3. Procedures:**

- a) Lack of safe work procedure
- b) Inadequate or poor work procedure
- c) Failure to follow established procedure

### **4. Equipment:**

- a) Defective equipment
- b) Wrong use of equipment
- c) Wrong equipment for the job
- d) Poor maintenance
- e) Not using or misusing test or lockout devices
- f) Lack of personal protective equipment



## 5. Training and Supervision:

- a) Inadequate or poor training
- b) Inadequate or poor supervision
- c) Faulty/unclear instructions
- d) Lack of enforcement

## 6. Morale or Personal Factors:

- a) Behaviour or attitude
- b) Medication, alcohol, drugs
- c) Deadline pressures/cutbacks
- d) Personality conflicts
- e) Personal problems

\* Adapted From: Safety and Risk Services (SRS). November 2016. *Incident Investigation Training for Safety Committees* (PowerPoint Presentation Handout). Simon Fraser University.



# Situational Awareness (**OOPS!**)

- **Observe** surroundings (look, listen, smell, touch, taste – and don't discount the sixth sense – **something is wrong**).
- **Orient** yourself (What possible threats are present? What are others doing?).
- **Plan** what to do (How do I get away? Is help nearby? Where is the nearest fire extinguisher, first aid kit, Automatic External Defibrillator (AED), etc.
- **Stay Aware** (Over time, we tend to become complacent, so remind yourself to become present again).



# Your Attention Will Lapse – Expect That





# **(SLAPS) Preparing for Safety Hazards I**

Upon entering a work area and before using any equipment:

- **STOP!** Think Safety.
- **LOOK!** Observe the general environment & details.
- **ANALYZE!** Evaluate the potential hazards and risks:
  - Do I know how to operate the equipment? Or do I need additional training?
  - Is my clothing and footwear appropriate (steel toed boots, tight fitting non-flammable clothes, no rings, watches, ties, or pendants)? If I have long hair, is it tied back? Do I need protective gear (hard hat, safety glasses, gloves, rubber boots, respirator, safety clothing, etc.)?
  - Do I know where the on-off switches are, and where the nearest fire extinguisher/AEDS/first aid kits are located?
  - Are there any moving hazards (vehicles, people, animals) of which I need to remain aware? (NB. Using power tools alone is risky!) Tripping hazards?
  - Am I focused on the safe use of the equipment rather than personal issues?
  - Are there environmental (dust/chemicals/radiation risks to consider)?



# (**SLAPS**) Preparing for Safety Hazards 2

- **PREPARE!** Make required changes to ensure you can work safely at the work site.
- **SAFETY!** Reflect upon the completed task to determine if you took any unnecessary risks. Report potential safety issues to employers or supervisors, as appropriate.

**SLAPS!**



# The Meaning of Fire Alarms

- **Grab your stuff and get the flock out of here, **NOW!****
- Yes, it is probably a false alarm.
- But it might be a phosphine gas leak from the clean room in ENSC. In that case, if you ignore it, you are dead. Sorry.
- Fire alarms are intended to gain your attention, but they don't identify the type or seriousness of the problem. Always assume alarms are notifying you of the highest risk problem.





# Active Threats on Campus

An active threat is defined as *“one or more persons who seek out a target rich environment and participate in a random or systematic infliction of death or grievous bodily harm.”*

## In the Following Order:

- 1. Run:** If you see or hear an armed intruder and it is possible to safely exit the area.
- 2. Hide:** If you cannot evacuate safely, lockdown your location.
- 3. Act:** If you cannot run or hide, take direct action to protect yourself.



# Earthquake Preparedness

<b>Inside &amp; In Class</b>	<ul style="list-style-type: none"><li>• Stay inside, remain calm, stay where you are and protect yourself.</li><li>• Drop under a table, desk, or other sturdy piece of furniture.</li><li>• Hold on and remain covered until the shaking stops.</li><li>• Stay away from windows and shelves with heavy objects.</li><li>• If you can't get under something, flatten yourself or crouch against an interior wall.</li></ul>
<b>Outside</b>	<ul style="list-style-type: none"><li>• Stay outside.</li><li>• Go to an open area away from buildings, glass, power lines, and large conifers.</li><li>• Do not enter any buildings until they have been approved for re-entry.</li></ul>
<b>In Transit</b>	<ul style="list-style-type: none"><li>• If you are inside your car, pull over. Avoid overhead structures such as bridges and overpasses. Set the parking brake and stay inside the car.</li><li>• If you are on the bus, stay seated until the bus stops, then Drop, Cover, and Hold until the Shaking Stops. Stay inside if it is safe to do so.</li></ul>
<b>After the Quake</b>	<ul style="list-style-type: none"><li>• After the shaking stops count to 60 and then move cautiously outside to an open area and gather with others to wait for further information.</li><li>• Things may have shifted in the shaking so move carefully and remain alert for possible falling or collapsing debris (above or below you).</li><li>• Expect aftershocks. Avoid broken glass and debris. Do not use elevators.</li><li>• Do not re-enter buildings until they have been inspected and approved for re-entry. Check yourself and others nearby for injuries.</li></ul>



# Driving Safely at SFU

- Assume **ALL** pedestrians are not paying attention.
- **DO NOT** use your cell when driving at SFU (or elsewhere).
- Check the road conditions at SFU. Drive in accord with the weather conditions. Use winter tires at SFU from Nov through Mar. All-season tires are not good enough!
- Slow down!!! Especially near daycares and schools!!!
- Do shoulder checks.
- Scan the road ahead.
- Park close to the curb.
- Careful when driving next to parked cars/shrubs – children, cats, dogs, wildlife, and adults often emerge unexpectedly.
- Look out for cars/bikes before opening doors on the car.



# Walking Safely at SFU

- Assume **ALL** drivers are not paying attention.
- Remove earphones when entering buildings.
- Avoid reading e-mail, etc., while crossing roads.
- Look both ways before crossing a road.
- Wear one earphone rather than two.
- Look where you are walking (scan up/down and right/left).
- Look for ice, debris, and irregularities in the pavement.
- Watch for cars/buses.
- Walk on the sidewalk – **NOT** on the road.



# Automatic External Defibrillators (AEDs)

About 50 of these simple-to-use devices are strategically placed through the SFU campuses – note where they are:

<https://www.sfu.ca/srs/emergency/response/aed.html>.

1. Call Security at 778-782-4500 (Burnaby campus) or 911.
2. Start CPR for someone who **has collapsed and is not breathing**.
3. Send someone to get the AED. (Note that opening the wall case triggers an alarm).
4. Turn on the AED.
5. Follow instructions of the AED.
6. Continue chest compressions until 1<sup>st</sup> responders take over or patient starts breathing again.



# A Historical Sequelae

**OUCH!**



“This tool looks like a medical item from the early Star Trek™ series, and in a way there is truth in that statement. It was designed for surgical use and was most certainly a must-have inclusion in any emergency medical technician's kit. This tool is a ring cutter designed to remove rings from appendages, most notably fingers, where either the finger or the ring is damaged. Shown is a hand-powered version. Electric-powered and diamond blade upgrades are also known. **The removal of rings, jewellery and other loose items is strongly recommended when working around any type of machinery. Almost everyone has a story on this subject**” [emphasis added].

D.S. Orr. January 2017. *What is it?* Lee Valley & Veritas Woodworking Newsletter, volume 11, issue 3.  
<<http://www.leevalley.com/en/newsletters/Woodworking/2242/whatisit.htm>>



# Safety and Risk Services (SRS)

- If working with drones, dirigibles, or vehicles (or with high power applications) in ENSC 405W or 440, you must seek permission.
- For drones, dirigibles, or vehicles, contact Safety and Risk Services SRS (<https://www.sfu.ca/srs.html>), complete an application, and receive permission.
- For high power applications, please contact Fred Heep (ENSC Lab 1) for advising.
- Do this early in the semester to avoid delays.



# Office of Research Ethics (ORE)

- If working with devices that involve physically testing devices on yourself or other subjects, that involve bodily fluids, hazardous substances, or animals, you require permission to do so – no matter how innocuous the device may seem.
- **Failure to do so could result in you being sued by a third party or you being expelled from SFU.** Among other things, this is an issue of liability for SFU.
- Contact ORE if you want to test your project with human subjects (<http://www.sfu.ca/ore.html>).
- Ethics approval can be a slow process, so contact ORE as soon as possible in the semester.
- Consider using sensors as an alternative to deal with these issues.





# Conclusion



**It also has no concern for your fingers, toes, or eyes!**



**Please don't text and drive!**