"Safe work is the door to all work."

Advanced Manufacturing Technician Program

Safe Expectations:

Your C H O I C E & Your D R I V E

Federation for Advanced Manufacturing Education

Our Goal Today:

To improve the way we think & act about safety so together we can make a positive contribution to the Safety Culture within the AMT Program and our workplaces.

We want everyone to go home healthy and uninjured every day!

Our Objectives Today:

To openly discuss, with your active participation…

- What makes safety happen?
- The Toyota Way in Safety
- Common industrial safety topics
- A video of workplace hazards: the "Table of Terror"

Ultimately, to frame our way of thinking using "CHOICE" and "DRIVE" to develop and continuously improve our Safety Culture.

What makes SAFETY happen?

- Our choices and actions…
  - *Your* **CHOICE**
- Our desire for safe behavior…
  - *Your* **DRIVE**
- Our way of thinking…
  - *Our* **Safety Culture**

Any other ideas?

What is SAFETY?

- **Safety is the control of accidental loss**
  - **Control** is the ***exercising of restraint***
  - **Accidents** are **unintentional** events
  - **Losses** include…
    - injuries to **people**
    - damages to **property**
    - disruptions to **processes**

Safety eliminates or minimizes losses

What is Safety *Culture*?

- **Safety Culture is …**
  - **… an internalized value for safety**
  - **… an internally driven and initiated drive for safe behavior and safe actions**
  - **… pro-actively watching for the safety o others and of the general working environment**
  - **… a willingness to comply with safety rules and directives**
  - **… a feeling of ownership for building and sustaining a safe workplace.**

SAFETY is the control of accidental loss ……

that may occur from potential hazards within our work place…

- Compressed Air
- Compressed Gas Cylinders
- Confined Spaces
- Cranes, Hoists, etc.
- Electricity
- Elevated work
- Flammable Materials
- Hand Power Tools
- Hazardous Chemicals
- Hazardous Atmospheres
- Hot Work
- Material Handling
- Powered Vehicles
- Robots & other automated systems
- …and many, many more…

Hierarchy of Safety Controls

Preferred Controls

- **Elimination or Substitution** - ***substitution*** of hazardous materials with safe materials, ***reducing*** energy, speed, voltage, sound level, force, change process to eliminate noise, perform task at ground level if possible, and automate material handling.
- **Engineering Controls** - ventilation systems, machine guarding, sound enclosures, circuit breakers, platforms, guard railing, lift tables, and conveyors.

Behavior Controls

- **Warnings** - computer warnings, odors, backup alarms, labels, and lights.
- **Training & Administrative Controls** - safe job procedures, rotation of workers, safety equipment inspections, worker training, and lockout.
- **Personal Protective Equipment** - gloves, safety glasses, ear plugs, face shields, safety shoes, safety harnesses, and back belts.

3 Key Factors that impact Safety

❖ **Factor:** ***a circumstance, fact, or influence that contributes to a result or outcome***

- **Proper PLANNING**
  - **Risk assessments, backup plans, etc.**
- **Proper PREPARATION**
  - **Correct equipment/tools, PPE, etc.**
- **Proper PRACTICES**
  - **Standardized work, job instructions, etc.**

Your C-H-O-I-C-E…….

C	**Consider**	Think it through…
H	**Hazards**	What Job hazards exist ?
O	**Organize**	All the Job steps….
I	**Identify**	Identify the SAFE WAY!
C	**Communicate**	Share your work plan...
E	**Evaluate**	Evaluate results achieved

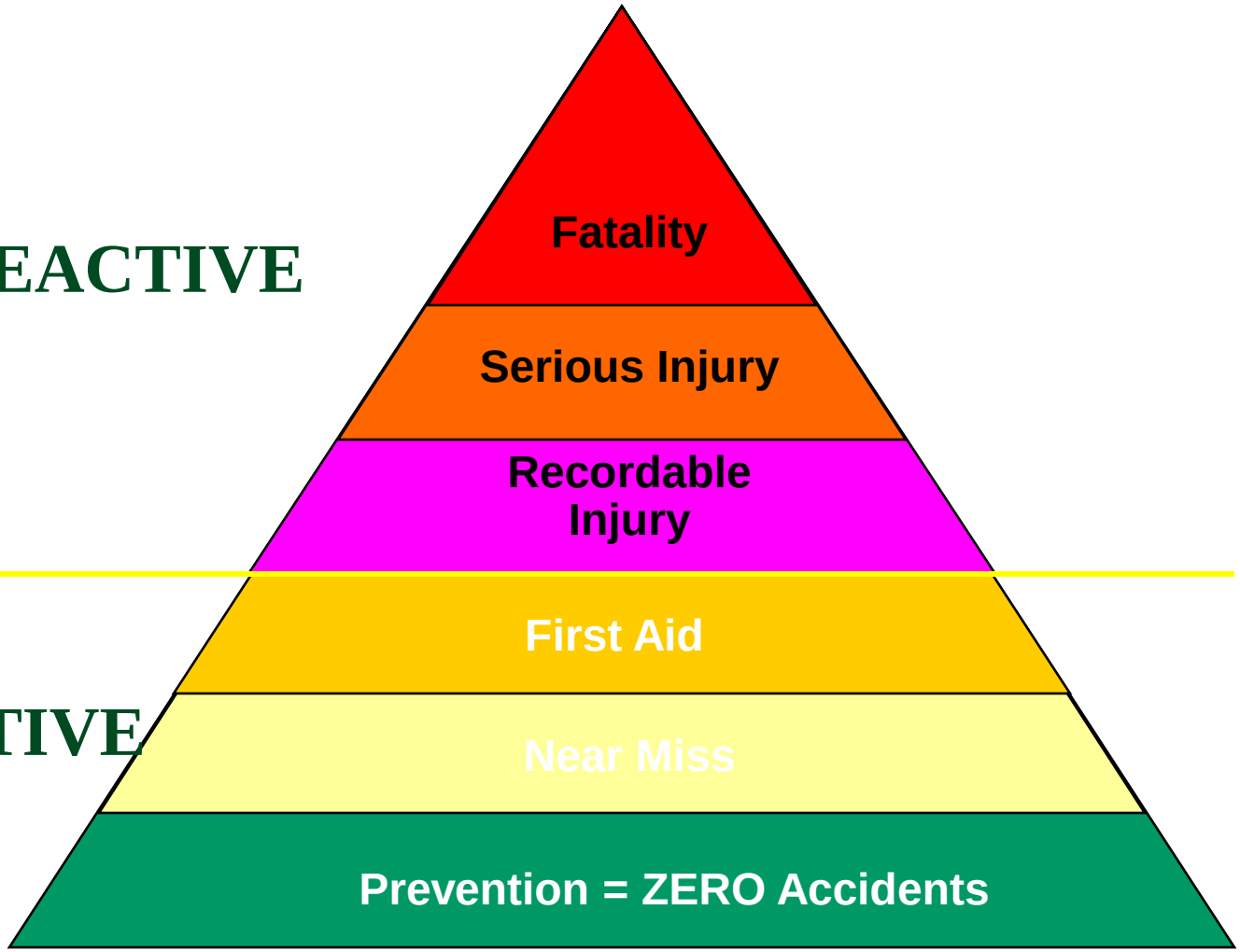
Your D-R-I-V-E…….

- **D** Develop my EYE for Safety
- **R** Responsibility is mine
- **I** I make safety happen
- **V** Value safe behavior
- **E** Every Accident is preventable

Shift your FOCUS……

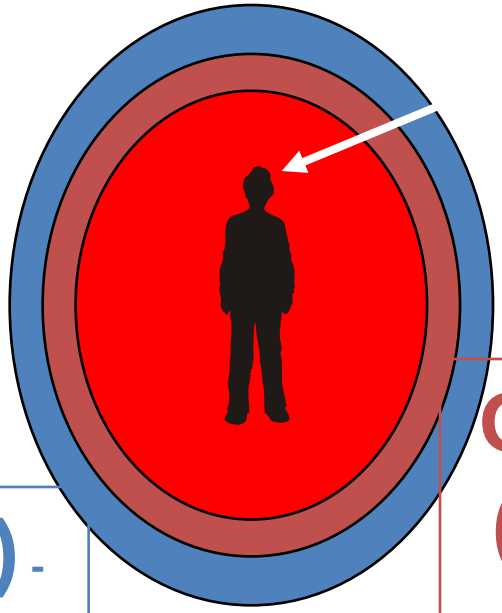
REACTIVE

PROACTIVE



What causes incident to occur?

Self (85-90%) - Your OWN actions cause or contribute to incident/injury

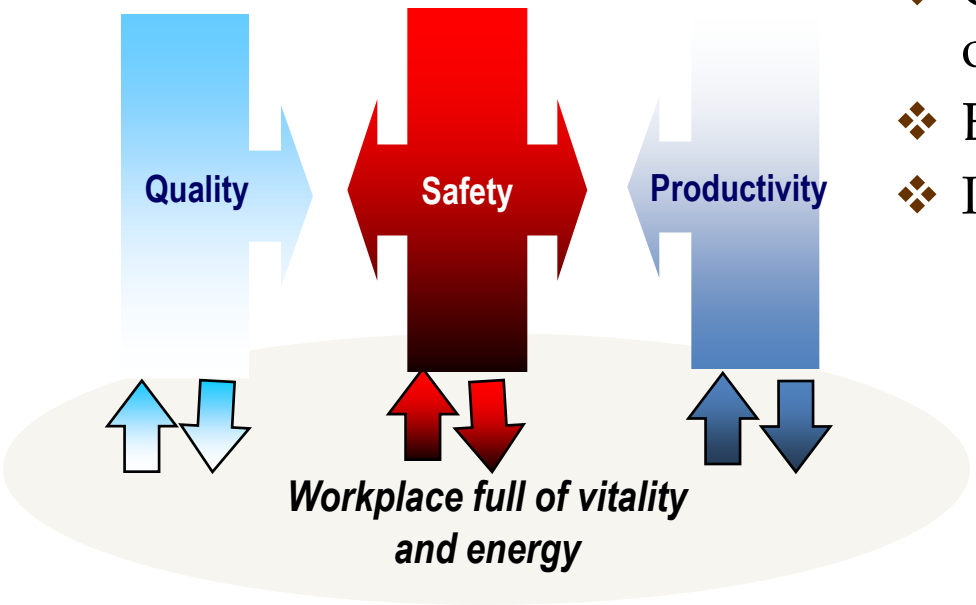


Other People (5-10%) - someone else's behaviour causes or contributes to incident/injury.

Events (3-5%) - something unexpected happens without you or someone else involved (e.g. wire rope breaks; traffic lights start working incorrectly; coupling fails; hose bursts; etc.)

Safety Is Management Itself

A workplace that is strong in safety will demonstrate its strength through quality and productivity.



- Creating a workplace that is full of vitality.
- Energizing employees.
- Improving production outputs.

Toyota's Safety Vision and Mission:

Vision:

To be the safest company in North America

Mission:

Ensuring safe equipment and process design

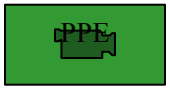
Developing world class safety management systems

Creating a positive safety culture

This is the foundation for all the work we perform

Team Member……

- Knowing and following safety procedures
- Correctly wearing all required PPE
- Monitoring their own safety throughout the plant by paying attention to what is happening around them and avoiding un-safe behaviors
- Continuously look for hazardous conditions or unsafe behavior and either correct it (if within their capabilities or report it to their supervisor)
- Identify problems and suggest improvements
- Report accidents and near misses 100% of the time
- Look out for others in the work place!

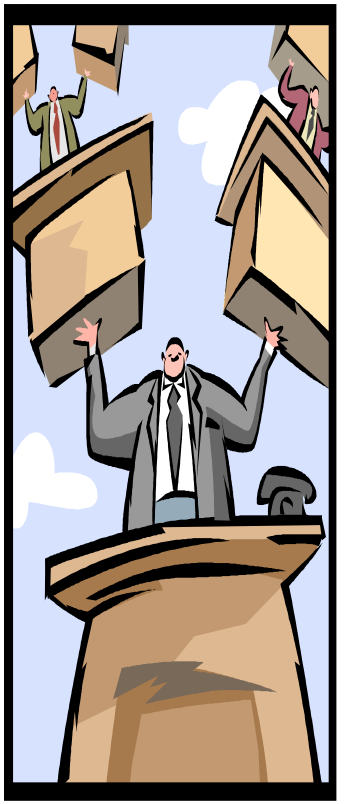


Safety Department……

- Set policy regarding Safety
- Consult mfg on emergent safety issues (respond to complaints, problems, spills, emergencies etc.)
- Investigate accidents, near misses and safety concerns
- Develop, conduct and manage safety training and safe operating practices for specific hazards
- Promote and coordinate plant wide safety awareness activities
- Conduct Industrial Hygiene data collection and analysis
- Conduct new equipment inspections
- Ensure legal compliance
- Evaluate chemicals and processes for hazards

Leadership……

- Ensuring successful safety programs are in place
  - Knowing what policies apply in their area
  - Understanding current status of compliance within the area
- Communicate the safety messages to team members
- Motivate team members to behave safely at all times
- Promote identification and kaizen activities and take and respond to suggestions for safety improvement
- Enforce safety rules
- Ensure safe equipment and supplies
- Develop a "manager's eye" to identify unsafe conditions and practices



Industrial Safety General Topics:

- Hazard Communication [MSDS]
- Personal Protective Equipment [PPE]
- Control of Hazardous Energy [Lockout]
- Electrical Safety [ESWP]
- Fall Prevention and Protection [Fall]
- Safety Toyota 'O incidents' Project [STOP6]
- Risk Prediction [KYT]
- Housekeeping [5S]
- Unsafe behaviors [CHIPS]

Hazard Communication [MSDS]:

- Right And Responsibility of all is to be aware of the hazards and proper work procedures for hazardous materials used or produced in their work area.
- Applies to all T/M, VWF, and Contractors working for Toyota or at Toyota Sites
- Know how and where to find specific hazard information.
- MSDS = Material Safety Data Sheet

Personal Protective Equipment [PPE] :

Control of Hazardous Energy [Lockout] :

Purpose

Typical Alternative Protective Measures [APMs]

Typical Energy Control Devices

Main Breaker

Master Valve

Electrical

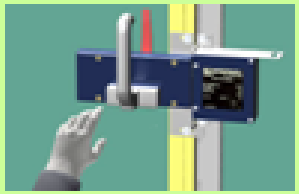
Air

E

Machine

Gate

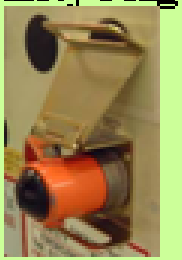
Interlock Devices



or

Operation Panel

Safety Plug



Key Switch

Lockable E-Stop Button

THE "FATAL FIVE"

The leading causes for lockout accidents include:

1. Failure to stop equipment
2. Failure to disconnect from the power source
3. Failure to dissipate residual energy
4. Unexpected start-up of equipment
5. Failure to clear work areas before reactivation

These causes are all easily preventable if you follow the Toyota Hazardous Energy Control procedures.

A person's behavior that began with a choice

Electrical Safety:

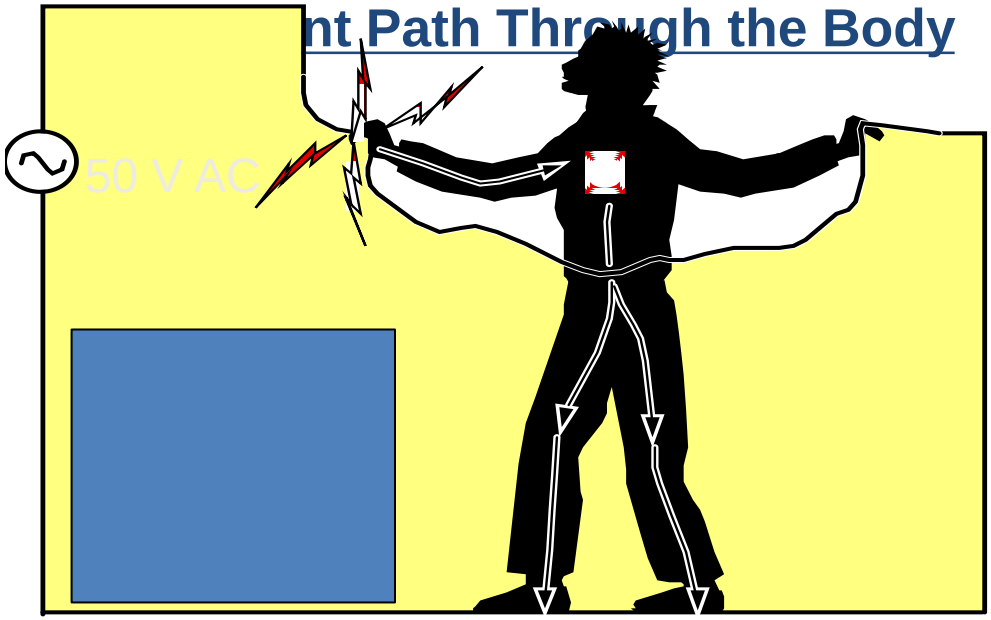
Two main hazards when working with electricity:

1. Shock

2. Arc Flash/Blast

Electrical Shock

- Shock caused by a difference in potential across the body
- Amount of current flow will depend on several factors:
  - Body resistance
  - Pathway through body
  - Duration of contact
  - Type of circuit
  - Voltage
  - Amperage
  - and other factors



Electrical Shock

- Shock can cause the following effects:
  - Ventricular fibrillation (disrupts normal heartbeat)
    - Current as low as 50 milliampers
    - Voltages as low as 50-volts with low skin resistance
    - Fibrillation can result in death
  - Tissue damage
    - Current high enough can cause third degree burns
    - Current entry and exit wounds possible
    - Internal damage may not show up for several weeks
  - Muscle contractions
    - Unable to release the conductor

Electrical Shock

- Actual Example:
  - 7.5-watt light bulb at 120-volts (using Ohm's Law)
  - Current will be 0.0625 amperes or 62.5mA (milliamperes)
  - This value of current passed through a person could cause:
    - ventricular fibrillation
    - respiratory paralysis

7.5 Watt Night Light

Arc Flash/Blast

Arc Blast – pressure wave caused by an Arc Flash.

- **Pressures have been measured above 2160 lbs/ft².**
- **Pressure Waves – A person standing 2 feet away from a 25,000 amp arc would experience a force of approximately 480 pounds.**
- **Temperature can reach up to 35,000 °F.**
  - Almost 4X the temperature of the sun.
- **The typical duration of an arc is 0.6 seconds.**
- **Copper vaporizes and expands at 67,000 times the volume of solid copper.**
- **Projectiles/fragments can be up to 1900°F and travel up to 700mph.**
- **Sound levels have been measured above 141dB.**
  - A jet engine at 100 feet is measured at 130 dB

ARC Flash & Blast

- Approximately one-half of serious electrical injuries involve burns from arcs
  - Severe Burns - Vision Damage
  - Broken Bones - Hearing Damage
  - Concussions - Collapsed Lung
  - Internal Burns - Death
- Only qualified persons should approach energized electrical equipment (with appropriate PPE)
- **Spectators and observers should stay away**
- Fatalities can occur as far as 10 feet or more from an arc
- Low-voltage can produce a higher energy arc than high-voltage
- Short-circuit current X voltage = arc energy
- 203^0F - skin not curable (cell death)

Electrical Safety Summary

- Three major hazards of electricity
  - Electrical Shock
  - Electrical Arc
  - Electrical Blast
- Best way to avoid an incident
  - STAY OUT OF THE CIRCUIT
- Personal Protection Equipment has been developed to protect qualified employees from these hazards
- Fatalities can occur at 120 Volts
- Fatalities can occur at 50mA

Fall Prevention & Protection:

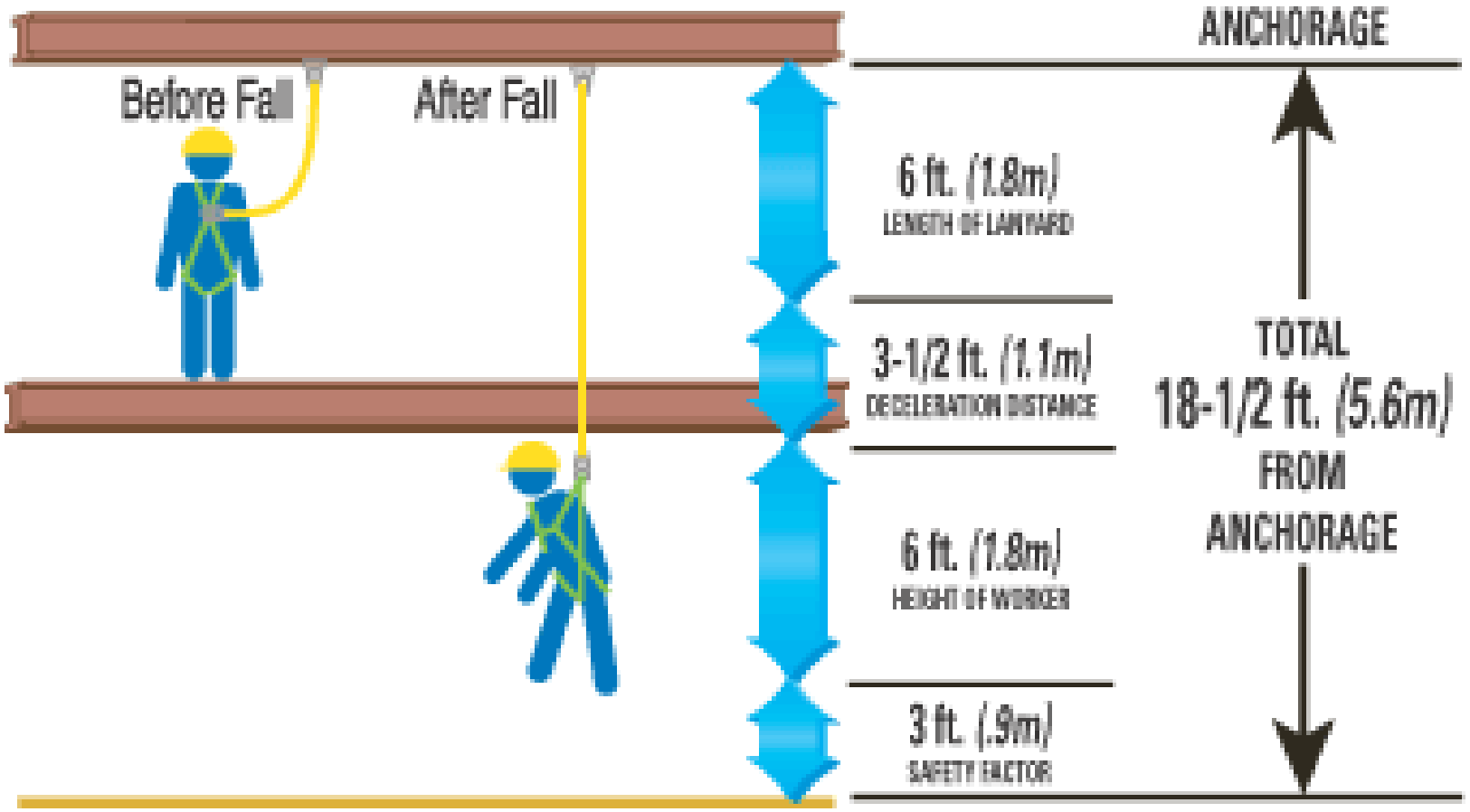
Where a Fall Hazard exists, there are two acceptable options:

- **1. Fall Prevention (defined as..the elimination of the fall hazard)**

or

- **2. Fall Protection (defined as…A control measure designed to minimize injury and eliminate death when a fall occurs.**

Fall Prevention & Protection:



Stop 6:

STOP 6 Definition:

- S = S afety
- T = T oyota
- O = 0 incidents
- P = P roject
- 6 = 6 Incident types

- TARGET IS 'zero'
  STOP 6 incidents

1.
2.
3.
4.
5.
6.

Housekeeping:

An organized workplace visualizes abnormalities and helps prevent injuries

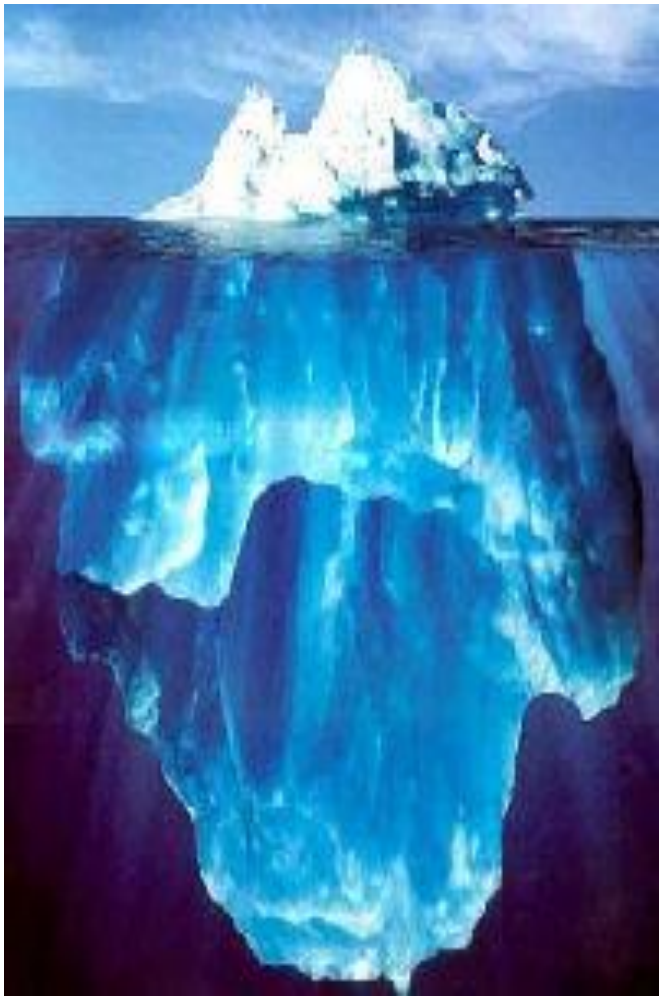
- A visually organized workplace is a SAFER workplace!

Remember this?

Master your "Visual Workplace Organization (5S)" capability!!

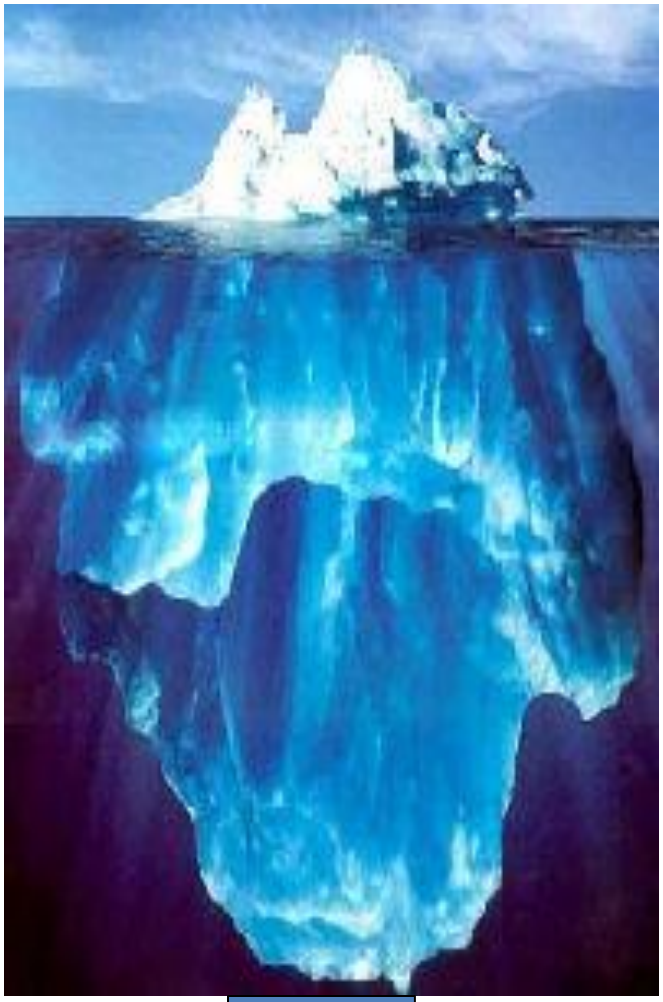
Risk Prediction [KYT] :

- **Climate**
  - The surface features of the safety culture discerned from the workforce's attitudes and perceptions at a given point in time
  - What is "seen"
- **Culture**
  - The shared values, beliefs, assumptions, and norms which may govern organizational decision making as well as individual and group attitudes about safety
  - What is "not seen" = Kiken Yochi Training [KYT = risk prediction]



Safety Talks for Risk Prevention:

- **What is a 'Safety Talk'?**
  - What is "seen" above the water line is easy to identify [reported accidents]
  - What is "not seen" below the surface is harder to identify [potential accidents]
- **Why Safety Talks?**
  - Everyone has experienced moments when they have sensed danger.
  - Safety Talks can use those moments to:
    - Prevents hazards from becoming an accident.
    - Change focus from reactive to proactive.
    - Develop your EYE for safety



Develop a Personal Safety Commitment

- A Personal Safety Commitment:
  - An individual statement that starts with "My."
  - Addresses a safety behavior
  - Specific and observable
  - Should address a behavior that you wish to change or strengthen, should not be something that you already do consistently and without thinking.
  - Should be based at work (for AMT and Interns)
  - Said before every group presentation
  - Can change, but does not change frequently (should last for at least several months)

How to Conduct an AMT Safety Talk

- Leader chooses topic, a Yoshi!, and prepares
- Form a circle. Make it a perfect circle.
- Leader discusses safety topic (3 minutes max)
- Team shares experiences and points
- Leader shares the Yoshi!
- All extend arm and point index finger up.
- Leader leads a loud "Yoshi!"
- Done

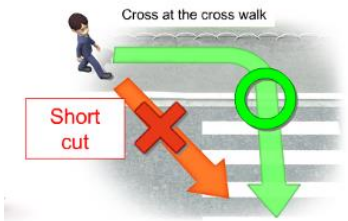
- CONDUCT AMT SAFETY TALK TRAINING

Chipping Away unsafe behavior

C — **Cell**

H — **Hands**

I — **Intersection**



P — **Point**

S — **Stair**

Table of Terror – DOJO DVD Review

- Class reviews entire DVD
- Open discussion on content
- Class reviews each incident to breakdown behavior
- Document observations
- Determine Top 3 'No Good' behaviors ?

Table of Terror

14:30 to 15:30 Video "Table of Terror"

Discussion

- Why do we want to ensure safe working conditions?
- How can you ensure safe working conditions?
- What is the relationship between a safe work place and increased productivity and quality?
- Who is the key person to promote the three principles of Safety and to make safety happen in the workplace?

Our Journey Forward:

"**OUR Safety** begins with **YOUR Plan** to Prepare, Practice, and Prevent"

Your ***C-H-O-I-C-E*** and Your ***D-R-I-V-E*** will ***MAKE SAFETY HAPPEN***!

END

Q & A