The National Safety Association for Canada's Energy

Concept Document - Attachment B

Line of Fire Program

DRAFT

Edition: #1
Release Date: October, 2025
Revised: October, 2025

ENERGY SAFETY CANADA

DRAFT

Disclaimer

This document is intended to be flexible in application and provide guidance to users rather than act as a prescriptive solution. Recognizing that one solution is not appropriate for all users and situations, it presents generally accepted guidelines that apply to industry situations, as well as recommended practices that may suit a company's needs. While we believe that the information contained herein is reliable under the conditions and subject to the limitations set out, Energy Safety Canada does not guarantee its accuracy. The use of this document or any information contained will be at the user's sole risk, regardless of any fault or negligence of Energy Safety Canada and the participating industry associations.

Copyright/Right to Produce

Copyright for this document is held by Energy Safety Canada, 2025. All rights reserved.

Energy Safety Canada encourages the copying, reproduction and distribution of this document to promote health and safety in the workplace, provided that Energy Safety Canada is acknowledged. However, no part of this publication may be copied, reproduced or distributed for profit or other commercial enterprise, nor may any part be incorporated into any other publication, without the written permission of Energy Safety Canada.

Energy Wheel

The Energy Wheel is a visual tool used in safety management to help identify, categorize, and manage hazards based on the types of energy present in the workplace. It simplifies the hazard recognition process by focusing on the various energy sources that could cause harm if not properly controlled. The Energy Wheel is widely used during hazard identification, job hazard analysis (JHA), and toolbox talks to ensure that workers identify and mitigate energy-related hazards. The figures below provide illustrations of the Energy Wheel.

According to CSRA research, the use of the Energy Wheel offers deeper level of hazard identification with better outcomes (see the figure below).

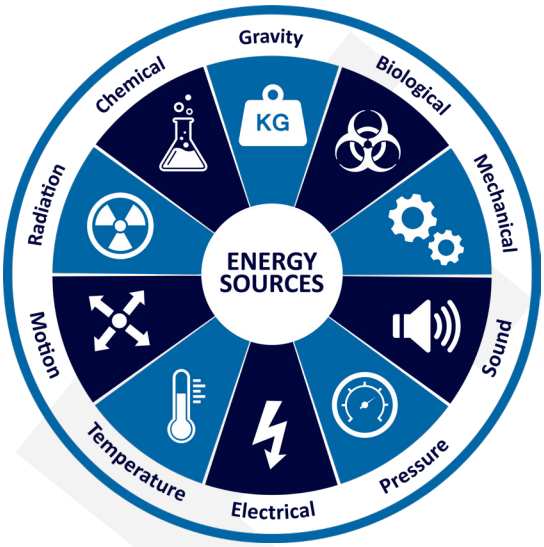

Figure 2: Energy wheel

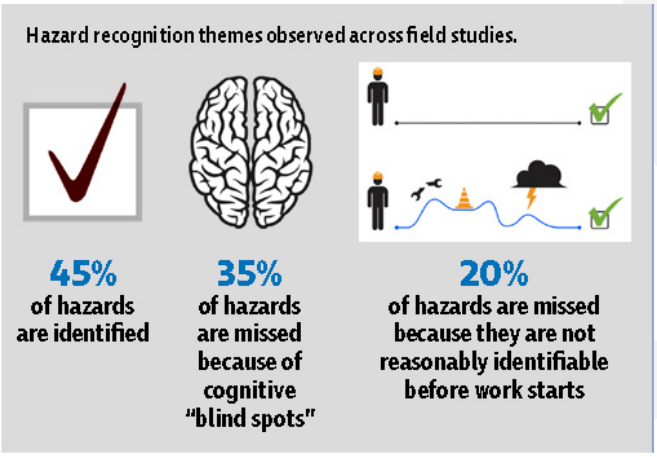

Figure 1: Hazard Recognition Themes

Purpose of the Energy Wheel

The Energy Wheel serves several key purposes:

- Hazard Identification: Helps identify hidden or overlooked hazards by categorizing them into energy types.
- Risk Awareness: Improves worker understanding of where energy exists and how it could cause harm.
- Standardized Approach: Provides a consistent method for identifying and communicating hazards across different job roles and industries.
- Control Prioritization: Guides the implementation of safety controls to mitigate energy hazards effectively.

DRAFT

Energy	Key Components
Gravity	• Force caused by the attraction of mass to the earth. It enables objects to fall, roofs to collapse and people to trip and fall. • Examples: Falling tools, unsecured materials at elevated surfaces.
Motion	• Change in the physical position or location of objects or substances. • Examples: Vehicles, mobile equipment, rotating machinery, projectiles, swinging loads, conveyors.
Mechanical	• Working parts of a machine or assembly, including rotation, vibration, tension, or compression. • Examples: A moving car, a wind turbine's spinning blades, A roller coaster at the top of a hill, a stretched rubber band, crane lifting a heavy load.
Electrical Energy	• Energy from electrical sources. Presence of electrical charge or current. • Examples: Live electrical circuits, power lines, arc flashes, exposed wiring, energized equipment.
Sound/ Vibration	• Audible vibration caused by the contact of two or more objects. Energy from sound waves or vibrating equipment. • Examples: Jackhammers, vibrating machinery, prolonged noise exposure, pile drivers.
Pressure Energy	• Energy from pressurized liquids, gases, or systems. Liquid or gas compressed or under vacuum. • Examples: Compressed air, hydraulic systems, pneumatic systems, gas cylinders, steam.
Tempera-ture	• Energy from heat or cold. Intensity of heat or cold in an object or substance. • Examples: Welding, furnaces, hot surfaces, cryogenic materials, steam lines, friction, and weather.
Chemical Energy	• Energy stored in or released from chemicals. Flammable or toxic objects or substances that pose health & safety risks. • Examples: Flammable liquids, corrosive chemicals, explosive reactions, toxic substances, engine exhaust, silica, wood dust.
Radiation	• Objects or substances that emit electromagnetic waves or subatomic particles. • Examples: Welding arcs, sun exposure, x-ray testing, radioactive waste, microwaves, lasers, and NORM.
Biological Energy	• Contamination from biological agents that could affect humans negatively or infect the workplace. • Examples: Bacteria, viruses, fungi, parasites, poisonous plants and animals (bees, snakes, alligators, bears, contaminated food).

How Energy Wheel is Used

The Energy Wheel is typically applied in various workplace safety activities, including hazard assessments, pre-task planning, and safety training. Below are the key steps to using the Energy Wheel effectively:

Aspect	Key Components
Identifying Energy Sources	Before starting a task, workers use the Energy Wheel to identify all potential energy types in the work environment. Workers ask questions like: • Is there motion (kinetic energy)? • Is anything under tension, pressure, or height (potential/gravitational energy)? • Are chemicals or electrical systems present? Example: On a construction site, the Energy Wheel might reveal hazards such as: • Suspended loads (gravitational energy) • Moving forklifts (kinetic energy) • Electrical wiring (electrical energy)
Assessing the Energy Hazards	Once energy sources are identified, evaluate the likelihood and severity of potential incidents. Consider what could happen (consequence) if the energy is released unexpectedly. Rank the hazards by their consequences to determine which hazards require immediate action. Example: • A pressurized cylinder leaking (pressure energy) could lead to an explosion. • Rotating machinery without guards (kinetic energy) could entangle a worker.
Implementing Controls	Use the Hierarchy of Controls to mitigate energy-related hazards: • Elimination: Remove the hazard (e.g., lower suspended loads to the ground). • Substitution: Replace hazardous energy sources (e.g., replace chemical solvents with safer alternatives). • Engineering Controls: Install barriers, machine guards, or energy isolation devices. • Administrative Controls: Develop safe operating procedures, implement lockout/tagout (LOTO), and conduct energy-focused toolbox talks. • PPE: Use protective equipment like harnesses, gloves, arc flash suits, and hearing protection. Example: • For electrical energy hazards, workers may use lockout/tagout (LOTO) procedures to de-energize equipment.
Pre-Task Planning and Toolbox Talks	Before starting work, supervisors and teams discuss energy-related hazards using the Energy Wheel. Questions to guide discussion: • What types of energy are present in this task? • How could the energy be released, and what are the consequences? • What controls are in place to manage the energy safely?

Incident Investigation	• After an incident, the Energy Wheel can help analyze what type of energy was involved and how it was released. • This helps identify gaps in controls and prevents future incidents. Example: If a tool falls from height, the investigation will focus on the gravitational energy and the failure to implement exclusion zones or tethering tools.

Benefits of the Energy Wheel

- Simplify Hazard Identification: By categorizing hazards into energy types, workers can systematically identify risks.
- Improve Awareness: Workers become more mindful of energy sources and the risks associated with them.
- Prevent Incidents: Focusing on controlling energy reduces the likelihood of unexpected releases causing harm.
- Enhance Communication: The Energy Wheel provides a visual, standardized tool for discussing workplace hazards.
- Support Training: It is an effective tool for educating workers about energy hazards and safety controls.

For more information on Energy Wheel, visit this ESC LINK.

Hierarchy of Control

The hierarchy of controls is a systematic approach used to eliminate or minimize hazards associated with energy sources in the workplace. This hierarchy is part of safety management systems and is commonly applied in industries where workers may be exposed to hazardous energy during the operation, maintenance, or servicing of equipment. The hierarchy is structured from the most effective controls to the least effective, emphasizing the importance of eliminating or reducing the risk at its source.

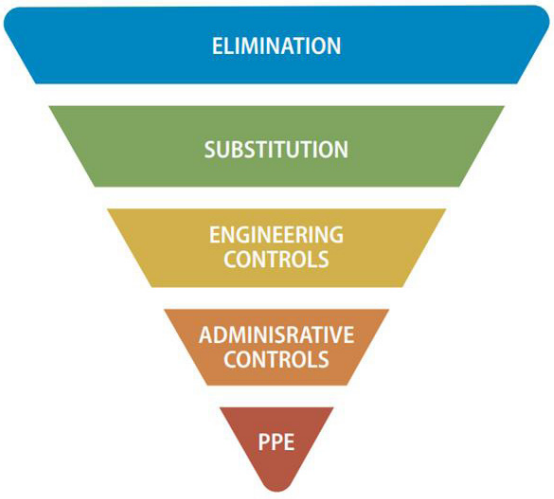

Figure 3: Hierarchy of controls

DRAFT

Types of Hierarchy of Control

Type	Description
Elimination	• Definition: Physically removing the hazardous energy source. • Example: Designing machinery that doesn't require energy to perform certain functions or permanently decommissioning unused equipment. • Effectiveness: Most effective, as it completely removes the hazard.
Substitution	• Definition: Replacing a hazardous energy source with a less hazardous one. • Example: Using low-voltage systems instead of high-voltage systems where possible. • Effectiveness: Highly effective but may not always be feasible.
Engineering Controls	• Definition: Designing or modifying equipment or processes to reduce exposure to hazardous energy. • Example: Installing machine guards, interlocks, or energy isolation devices like circuit breakers or valve locks. • Effectiveness: Effective and can be permanent if properly implemented.
Administrative Controls	• Definition: Implementing policies, procedures, and training to reduce exposure. • Example: Lockout/tagout (LOTO) procedures, employee training, warning signs, and scheduled maintenance protocols. • Effectiveness: Less effective than engineering controls because they rely on human compliance and behavior.
Personal Protective Equipment (PPE)	• Definition: Using equipment worn by workers to protect against residual risks. • Example: Insulated gloves, safety glasses, and face shields. • Effectiveness: Least effective, as it does not eliminate the hazard but provides a last line of defense.

How They Are Used

The hierarchy is applied as a decision-making framework when addressing energy-related hazards:

- Assessment: Identify potential energy hazards during tasks like maintenance or operation.
- Prioritization: Aim to apply controls at the top of the hierarchy (elimination or substitution) wherever feasible.
- Implementation: Introduce engineering and administrative controls if elimination or substitution isn’t practical.
- Training: Ensure all employees understand and comply with established controls.
- Evaluation: Continuously monitor and evaluate the effectiveness of controls, making adjustments as needed.

Practical Example: Lockout/Tagout (LOTO) Procedures

Energy Hazard: Machinery with stored electrical energy.

Controls Applied:

- Elimination: Not feasible.
- Engineering: Install disconnect switches or isolation devices.
- Administrative: Develop and enforce LOTO procedures.
- PPE: Workers wear insulated gloves and use safety tools.

Life-Saving Rules

Life-Saving Rules (LSR) are a set of globally recognized safety principles designed to prevent serious injuries and fatalities in high-risk industries, such as construction, energy, manufacturing, and transportation. These rules focus on critical workplace hazards and outline essential behaviors that workers must follow to stay safe.

Confined Space

Obtain authorization before entering a confined space

Working at Height

Protect yourself against a fall when working at height

Work Authorization

Work with a valid permit when required

Energy Isolation

Verify isolation and zero energy before work begins

Line of Fire

Keep yourself and others out of the line of fire

Bypassing Safety Controls

Obtain authorization before overriding or disabling safety controls

Driving

Follow safe driving rules

Hot Work

Control flammables and ignition sources

Safe Mechanical Lifting

Plan lifting operations and control the area

Fit for Duty

Be in a state to perform work safely

DRAFT

Key Life-Saving Rules Line of Fire and Incident Prevention

"Line of fire" incidents occur when a person is in the direct path of a moving object, high-energy force, or hazardous release. Examples include:

- Getting caught between moving machinery parts.
- Being struck by falling objects.
- Standing in the path of pressurized fluid or gas releases.

To prevent these incidents, Life-Saving Rules emphasize:

- Awareness and Risk Assessment – Identifying hazards before starting work.
- Safe Work Practices – Keeping a safe distance from hazardous areas.
- Barriers and Controls – Using physical barriers, safety zones, and proper signage.
- Proper Equipment Usage – Handling tools and machinery correctly to avoid accidental movement.

See more on LSR Program at this LINK.

Stuff that can Kill You

"Stuff That Can Kill You" (STCKY) is a safety concept used to identify and manage hazards or conditions in the workplace that pose a significant risk of serious injury or fatality. It emphasizes the importance of recognizing high-risk elements in work environments, which can cause life-ending, life-threatening or life-altering incidents if not properly controlled. See The Life Model by CSRA below.

The concept focuses on prioritizing the identification, control, and management of hazards that have the potential to cause severe harm, unlike minor risks that might only result in superficial injuries.

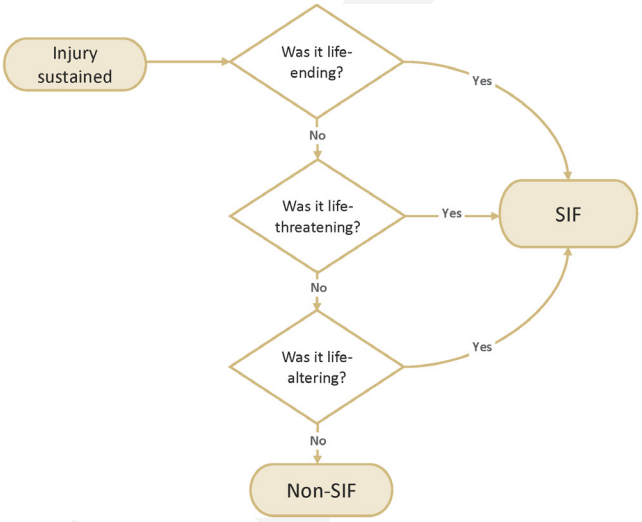

Figure 4: CSRA the life model

What Constitutes STCKY?

STCKY refers to hazards with a high energy potential or scenarios where unsafe interactions can lead to severe or fatal outcomes. These hazards often involve significant forces, energy sources, or dangerous conditions.

Examples of STCKY:

- Kinetic Energy: Moving vehicles, heavy machinery, swinging loads, rotating parts.
- Potential Energy: Falling objects, elevated platforms, suspended loads, unstable structures.
- Electrical Energy: Exposed live electrical wires, arc flash hazards, and faulty electrical systems.
- Chemical Energy: Flammable, reactive, or toxic substances, chemical spills, or pressurized tanks.
- Thermal Energy: Welding, cutting, grinding, or exposure to extremely hot or cold surfaces.

- Confined Spaces: Oxygen-deficient environments, toxic gases, or entrapment hazards.
- Pressure Hazards: Burst pipes, compressed gas cylinders, and pressurized systems.

Additional examples are provided in the figure below.

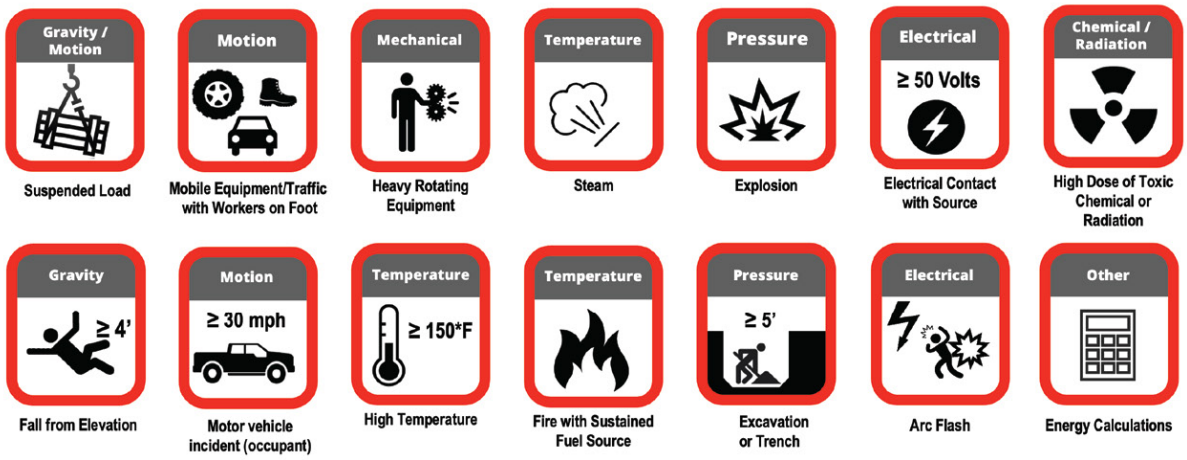

Figure 5: CSRA, STKY

Purpose of STCKY

The STCKY concept serves several purposes:

- Hazard Recognition: Encourages workers to actively identify elements in their work environment that could cause severe harm.
- Prioritization of Risks: Focuses attention on life-threatening risks rather than less severe hazards.
- Immediate Mitigation: Promotes proactive measures to eliminate, control, or minimize exposure to STCKY hazards.
- Safety Culture: Raises awareness among workers and leaders to prioritize safety for high-risk activities.

DRAFT

How STCKY is Used in Workplace Safety

Aspect	Key Components
Identification of STCKY Hazards	• Conduct workplace risk assessments to identify equipment, conditions, or processes that pose life-threatening risks. • Use visual tools like Energy Wheels or hazard matrices to categorize and map STCKY hazards based on energy types. Example: • A worker identifies an overhead crane load that could fall and crush someone (STCKY related to potential energy).
Communication and Awareness	• Training Sessions: Educate workers to recognize STCKY hazards during daily activities. • Toolbox Talks: Discuss STCKY hazards before starting high-risk work. • Visual Cues: Use signage, barriers, or labels to mark STCKY zones or equipment.
Prioritization and Controls	Apply the Hierarchy of Controls to STCKY hazards: • Elimination: Remove the hazard (e.g., replace manual lifting with mechanical aids). • Engineering Controls: Install machine guards, fall arrest systems, or energy isolation devices. • Administrative Controls: Implement Permit to Work (PTW), Job Hazard Analysis (JHA), and safe operating procedures. • PPE: Use high-grade protective gear (e.g., harnesses, arc flash suits, respiratory protection). Example: • Lockout/tagout (LOTO) procedures are enforced to control energy before working on high-voltage electrical systems.
Monitoring and Enforcement	• Supervisors ensure that controls are actively in place when workers are near STCKY hazards. • Safety audits or inspections help confirm that processes comply with safety standards.
Incident Learning and Prevention	• Analyze near-misses or incidents involving STCKY to identify root causes and prevent recurrence. • Update risk assessments and safety measures based on findings

Practical Examples of STCKY in Use

Construction Site:

- STCKY: Working under a suspended load from a crane.
- Control: Exclusion zones are marked, workers wear helmets, and lifting operations follow strict safety checks.

Manufacturing Facility:

- STCKY: Moving conveyor belts with exposed pinch points.
- Control: Install machine guards, emergency stop buttons, and conduct operator training.

Energy Sector:

- STCKY: Maintenance on live electrical lines.
- Control: Implement lockout/tagout procedures, insulated tools, and require arc flash PPE.

Chemical Plant:

- STCKY: Handling pressurized gas cylinders.
- Control: Store cylinders upright, secure them, and ensure proper ventilation.

Benefits of Using the STCKY Concept

- Life-Saving Focus: By identifying "stuff that can kill you," workplaces address the most severe hazards first.
- Simplified Approach: Workers can easily relate to the idea of STCKY, making hazard recognition straightforward.
- Enhanced Safety Culture: Promotes vigilance and prioritization of high-risk activities.
- Reduced Incidents: Proactively controlling STCKY hazards leads to fewer serious injuries and fatalities.
- Compliance: Helps meet legal and regulatory safety requirements.

Here is a sample of STCKY Inspection Sheet.

Critical Work

Critical work refers to tasks or activities in a workplace that involve significant risk to people, property, or the environment. These tasks often require precise planning, specialized skills, and strict safety measures due to the potential for severe consequences if something goes wrong. Examples include high-risk construction activities, maintenance of hazardous systems, or operations in confined spaces.

Managing critical work effectively is essential to:

- Protect lives and minimize injury.
- Prevent damage to equipment and property.
- Ensure compliance with legal and safety standards.
- Maintain operational continuity.

Characteristics of Critical Work

1. High Risk: Involves hazards with a high potential for harm, such as working at heights or handling toxic materials.
2. Specialized Skills: Requires trained personnel with certifications or specific competencies.
3. Strict Compliance Needs: Must adhere to regulatory and safety standards.
4. Complex Coordination: Often involves multiple teams or contractors, requiring detailed planning.

Examples of Critical Work

- Working at Heights: Use of scaffolding, lifts, or working on roofs.
- Confined Space Entry: Maintenance or inspections in tanks, tunnels, or silos.
- Hot Works: Welding, cutting, or grinding activities that may produce sparks or heat.
- Lifting Operations: Use of cranes or heavy equipment to move large loads. Simultaneous operations.
- Electrical Works: Repair or maintenance of live electrical systems.
- Hazardous Materials Handling: Storage, transport, or use of chemicals, gases, or explosives.

Best Practices for Effective Management

1. Plan Thoroughly: Start with a comprehensive risk assessment and clear work plan.

DRAFT

2. Communicate Clearly: Ensure all workers understand their roles, risks, and safety procedures.
3. Enforce Strict Controls: Apply a combination of engineering, administrative, and PPE measures.
4. Review Continuously: Monitor the activity in real-time and update protocols based on lessons learned.

Direct Control

Direct Control refers to the proactive and hands-on supervision, intervention, and management of work activities to ensure that safety standards and protocols are strictly followed. It involves real-time oversight by competent personnel to minimize risks and immediately address any unsafe conditions or behaviors. DIRECT Controls work even if workers make errors.

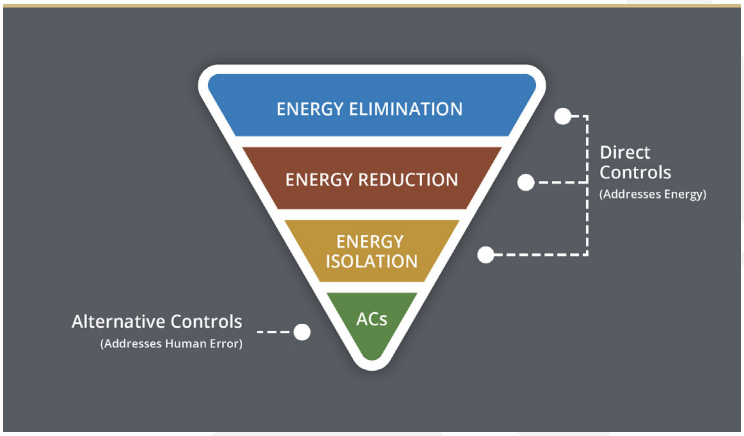

Figure 6: CSRA, hierarchy of energy controls

Figure 7: CSRA, direct controls requirements

DRAFT

Alternative Controls are specifically designed to mitigate human error. When a Direct Control is not feasible, there must be at least two Alternative Controls, from at least two or more of the following categories.

Figure 8: CSRA, alternative controls

For more on Direct Controls, see this CSRA LINK.

High Energy Control Assessment (HECA)

A High Energy Control Assessment (HECA), also known as energy-based observation, is a structured process used to identify, evaluate, and control risks associated with high-energy activities in the workplace.

These activities involve significant energy sources, such as mechanical, electrical, chemical, or thermal energies, that have the potential to cause catastrophic injuries or damage. HECA ensures that organizations assess and implement robust controls to manage these risks effectively.

Purpose of HECA:

- Risk Identification: Pinpoint high-energy sources and associated hazards.
- Control Validation: Ensure that existing controls (engineering, administrative, and PPE) are appropriate and effective.
- Continuous Improvement: Provide a systematic review for enhancing safety protocols in high-energy tasks.
- Regulatory Compliance: Help organizations meet safety standards and legal requirements.

DRAFT

Key Components of HECA

Aspect	Key Components
Identification of High-Energy Sources	• Mechanical Energy: Moving machinery, rotating parts, or lifting operations. • Electrical Energy: High-voltage systems, live electrical circuits. • Chemical Energy: Flammable or reactive substances under pressure. • Thermal Energy: Hot surfaces, welding, cutting, and molten material. • Potential Energy: Suspended loads, pressurized springs, or raised equipment.
Hazard Assessment and Risk Ranking	• Assess Potential Consequences: Consider the worst-case outcomes (e.g., fatalities, amputations). • Determine Likelihood: Assess how likely an incident is to occur based on current controls. • Rank Risks: Use a risk matrix to prioritize high-risk areas that require urgent attention.
Control Measures Evaluation	• Engineering Controls: Physical changes to the environment or process (e.g., machine guards, barriers). • Administrative Controls: Procedural changes, training, and permit-to-work systems. • PPE and Physical Barriers: Equipment to protect workers from exposure (e.g., arc flash suits, hard barriers). • Isolation and Lockout/Tagout (LOTO): Procedures to de-energize systems before work begins.
Documentation and Procedural Reviews	• Review Procedures: Ensure that all procedures related to high-energy work (e.g., maintenance protocols, LOTO practices) are documented and followed. • Update Controls: Regularly update controls based on findings from the assessment.
Regular Audits and Verification	• Field Verification: Regular site audits to verify compliance and control effectiveness. • Feedback Loop: Incorporate feedback from workers and supervisors to refine processes. • Incident Analysis: Use information from past incidents or near misses to improve HECA outcomes.

How HECA is Used in Practice

Aspect	Key Components
Pre-Task Planning and Risk Assessment	• Initial Walkthrough: Identify all energy sources in the work area. • Task-Specific Risk Analysis: Perform a detailed assessment for specific tasks that involve high-energy exposure. • Permit Systems: Integrate HECA findings into permit-to-work processes, ensuring that high-energy tasks are clearly authorized and controlled.
Development of Control Measures	• Engineering Adjustments: Implement recommendations from the HECA, such as improved machine guarding or enhanced isolation methods. • Enhanced Procedures: Develop or revise work procedures to include HECA recommendations. • Emergency Response Preparedness: Ensure that emergency response protocols are aligned with high-energy hazards.
Training and Competency	• Worker Training: Provide specific training on high-energy hazards and the controls identified through HECA. • Supervisor Oversight: Train supervisors on how to monitor and enforce high-energy controls.
Continuous Monitoring and Improvement	• Regular Assessments: Schedule periodic HECA reviews, especially when changes in equipment or processes occur. • Incident Reviews: After an incident or near-miss, conduct a HECA to identify failures and opportunities for improvement. • Feedback and Auditing: Collect ongoing feedback from personnel and conduct regular audits to ensure controls remain effective.

To use HECA at worksite:

1. Identify your high-energy hazards

- Because HECA is only concerned with high energy, field crews must first identify all sources of high energy present on their job sites. Hazard identification can happen as part of a tailboard meeting or pre-job safety briefing, or it can happen any time a worker spots a hazard.

2. Conduct the assessment

Using a HECA form or interactive app, inspectors conduct the assessment by checking all high-energy hazards identified by the work crew. For each one, the inspector must confirm that each hazard has a direct control that meets three criteria:

- The control is specifically targeted to the high-energy source.
- It effectively mitigates exposure to high energy.
- It works even if someone makes a mistake.

If a control meets all three criteria, inspectors mark that high-energy hazard as “success”. If not, the high-energy hazard is uncontrolled, and it gets marked as “exposure.” Then, a crew must find and implement a control before starting work safely.

3. Calculate your HECA score

After the assessment, inspectors can calculate the HECA score by dividing hazards marked as "success" by the sum of all hazards marked both "success" and "exposure." This number gives you an overall percentage of high-energy hazards left uncontrolled prior to conducting a HECA.

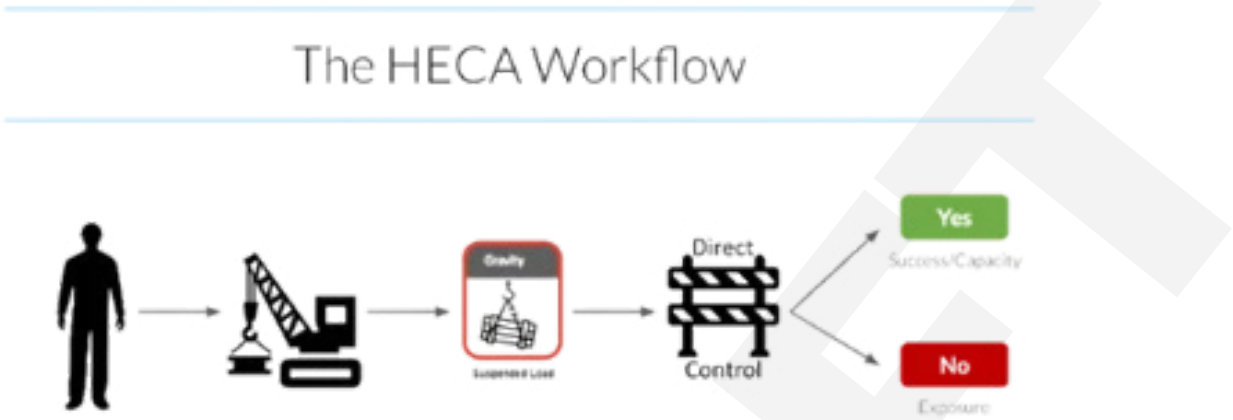

Figure 9: Urbint, the HECA workflow

Example of Using HECA in Practice

Scenario: Maintenance of a high-voltage electrical system. Consider the following steps:

1. Identification: Determine the electrical energy involved and any potential arc flash risks.
2. Assessment: Evaluate the likelihood and consequences of an arc flash incident.
3. Controls: Implement LOTO procedures, require arc-rated PPE, and ensure insulated tools are used.
4. Verification: The supervisor verifies all safety controls before authorizing work, and spot-checks compliance during the task.
5. Documentation: Record the HECA findings in the work permit system and conduct a post-task review.

Benefits of HECA

- Improved Safety: Reduces the likelihood of catastrophic incidents involving high-energy sources.
- Compliance Assurance: Ensures adherence to industry safety standards and legal requirements.
- Systematic Risk Management: Provides a structured approach to managing and mitigating high-energy risks.
- Enhanced Worker Confidence: Builds confidence among workers who see active efforts to manage dangerous tasks safely.
- Better Incident Prevention: Identifies gaps in current controls and provides recommendations for improvement.

Challenges and Considerations

- Resource Allocation: Proper implementation may require investment in training, equipment, and process modifications.

DRAFT

- Consistency: Regular monitoring and review are essential to maintain the effectiveness of the controls.
- Worker Engagement: Success relies on the active participation and adherence of the workforce to safety protocols.

For more information on HECA, visit this CSRA LINK and Urbint Blog.

Relationship between Line of Fire, STCKY and Energy Wheel

The concepts of "Line of Fire", "Stuff That Can Kill You (STCKY)", and the "Energy Wheel" are interconnected frameworks for identifying, understanding, and mitigating workplace hazards. They collectively emphasize the importance of recognizing energy sources, potential hazards, and actions that could lead to severe or fatal incidents.

Relationship between Line of Fire and "Stuff That Can Kill You (STCKY)":

STCKY focuses on the specific risks of being struck by objects or forces that can cause fatal injuries.

"Line of Fire" is a broader concept that includes not only struck-by hazards but also caught-in, caught-between, and energy-related hazards.

Connection:

- Both concepts aim to prevent incidents where workers are exposed to moving objects, falling materials, or forceful impacts.
- The STCKY principle highlights the extreme consequences of line-of-fire hazards and emphasizes avoiding areas where such risks are present.
- Example: A worker near a suspended load is both in the line of fire and at risk of a STCKY incident if the load falls.

Relationship between Line of Fire and the "Energy Wheel":

The Energy Wheel is a tool used to identify and understand energy sources present in a work environment. It categorizes energies into types such as:

- Kinetic Energy (moving objects, vehicles).
- Potential Energy (stored energy in suspended loads, pressurized systems).
- Electrical Energy, Chemical Energy, and others.

"Line of Fire" uses insights from the Energy Wheel to determine where workers might be exposed to these energy sources.

Connection:

- The Energy Wheel helps visualize and identify energy sources, while the line-of-fire concept applies this knowledge to position workers safely.
- Example: A pressurized gas line identified through the Energy Wheel represents potential energy; staying clear of the line of fire (e.g., the direction of a potential release) mitigates risks.

Unified Application:

These concepts combine to form a comprehensive approach to hazard prevention:

1. Use the Energy Wheel to map out energy sources in the work environment.
2. Apply the Line-of-Fire Concept to identify where workers are at risk of exposure to those energies.
3. Consider STCKY to focus on and prioritize the most severe consequences, such as fatal incidents from high-impact or high-energy events.

DRAFT

Practical Example of Integration

Scenario: A construction site with a crane lifting a heavy beam.

- Energy Wheel: Identifies potential energy (suspended load) and kinetic energy (swinging beam).
- Line of Fire: Highlights areas beneath and around the beam where workers could be struck if it falls or swings unexpectedly.
- STCKY: Emphasizes that a worker under the beam is at extreme risk of a fatal incident (struck that can kill you) if the load drops.

DRAFT