

The logo for VelocityEHS, featuring the word "Velocity" in a white, italicized sans-serif font, followed by "EHS" in a white, bold sans-serif font, with a registered trademark symbol (®) to the upper right of "EHS".

VelocityEHS[®]

Are Your JSAs Good Enough?

Don't Wait For A Workplace Incident To Find Out!

Greg Duncan, MELP, CSP, Sr. EHS &
ESG Content Manager, *VelocityEHS*

Meet Your Presenter



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Senior EHS & ESG Content Manager

VelocityEHS

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Agenda

- JSA Basics
- Best practices to optimize JSA
- Advanced risk assessment techniques
- Improving EHS systems and tools to support better JSA



Job Safety Analysis (JSA) Basics



What is Job Safety Analysis (JSA)?

- Sometimes known as job hazard analysis (JHA)
- Systematic method for identifying, assessing, and controlling job task hazards *and* risks
- Ideal documentation for communicating safe work practices



6 Key Benefits of JSA



- formalization of safe work instructions and practices, and risk criteria
- accountability for hazard identification, assessment, & control
- employee participation and engagement
- organizational learning
- hazard identification and situational awareness
- Loss/injury & illness prevention





Hazard ID & Observations, THA, JSA Differences

Criteria	Hazard Identification & Observations	Task Hazard Assessment (THA)	Job Safety Analysis (JSA)/ Job Hazard Analysis (JHA)
Purpose	Identify hazardous conditions or at-risk behaviors	Identify hazards for high-risk tasks (working at heights) and controls (fall protection)	Identify hazards with multiple jobs/tasks/activities, assess risk, identify existing controls, and determine additional controls
People Involved	1-2 People	1-2 People	3-6 People
Expertise Required	Observer	Task performer	Supervisor, operations, maintenance, EHS
Time	1-5 Minutes	2-10 Minutes	2-4 Hours
Risk Score	No	No	Yes
Frequency	Identify hazardous conditions/at-risk behaviors	Daily, pre-shift, or conducting high-risk task/non-routine work	Annually and new or modified jobs



Job Safety Analysis Process Overview



Example JSA

Dashboard / Job Safety Analyses / Job Safety Analysis

Example JSA (Draft) Print Send to Coordinator

Properties Job Safety Analysis

Search... Filter...

Actions ▼ Add

<input type="checkbox"/>	Task	Activity	Hazard	Target Principal Hazard	Exposure	Likelihood	Severity	People Impacted	Risk	Base Controls	Comments	Mitigated Risk
<input type="checkbox"/>	Task 1	<input type="checkbox"/> Routine	Fire	Chemical (Flammable)	Quarterly (5)	Almost Certain	First Aid / LTI	-	5000	- Chemical Safety - Emergency Response Procedure - First Aid and Medical Facilities		364
<input type="checkbox"/>	Task 2	<input type="checkbox"/> Routine		-	Annually (2)	Almost Certain	First Aid / LTI	-	2000			200

2 result(s)



Step 1: Job Selection

- Prioritize JSAs using the following criteria:
 - » Jobs with the highest frequency or severity of incidents and injuries
 - » Jobs with the highest potential for injury or illness
 - » Newly implemented jobs where hazards have not been identified
 - » Recently modified jobs



Step 2: Job Task Breakdown

- “Tasks” are individual steps or functions to complete a multi-step work process or “job”
- Break down jobs into a clearly defined sequence of individual tasks
- Avoid defining tasks either too narrowly or too broadly



Step 3: Identify Hazards

- Review the tasks and ask questions to identify hazards:
 - » Is there a potential to get caught in or crushed by equipment?
 - » Is there a potential for getting struck by moving or falling equipment or objects?
 - » Is there potential for slips/trips/falls?
 - » Is there rotating equipment?
 - » Is there a potential for strains or sprains?
 - » Is there a potential for cuts or lacerations?
 - » Are chemicals used? Which ones?



Step 4: Assess Risk

		Minor injuries or discomfort. No first aid or medical treatment	Injuries or illness requiring first aid	Injuries or illness requiring medical treatment	Injuries or illness resulting in restricted days, lost time, or hospitalization	Fatality	
		Very Low	Low	Medium	High	Extreme	
Likelihood	Expected to occur regularly under normal circumstances	Very Likely	Medium	High	Very High	Very High	Very High
	Expected to occur at some time	Likely	Medium	High	High	Very High	Very High
	May occur at some time	Possible	Low	Medium	High	High	Very High
	Not likely to occur in normal circumstances	Unlikely	Low	Low	Medium	Medium	High
	Could happen, but probably never will	Very Unlikely	Low	Low	Low	Medium	Medium



Step 4: Assess Risk

Severity

Very Low (1)	<input type="checkbox"/>
Low (2)	<input type="checkbox"/>
Medium (3)	<input type="checkbox"/>
High (4)	<input type="checkbox"/>
Extreme (5)	<input checked="" type="checkbox"/>

Likelihood

Very unlikely (1)	<input type="checkbox"/>
Unlikely (2)	<input type="checkbox"/>
Possible (3)	<input type="checkbox"/>
Likely (4)	<input type="checkbox"/>
Very likely (5)	<input checked="" type="checkbox"/>

Num of People Impacted

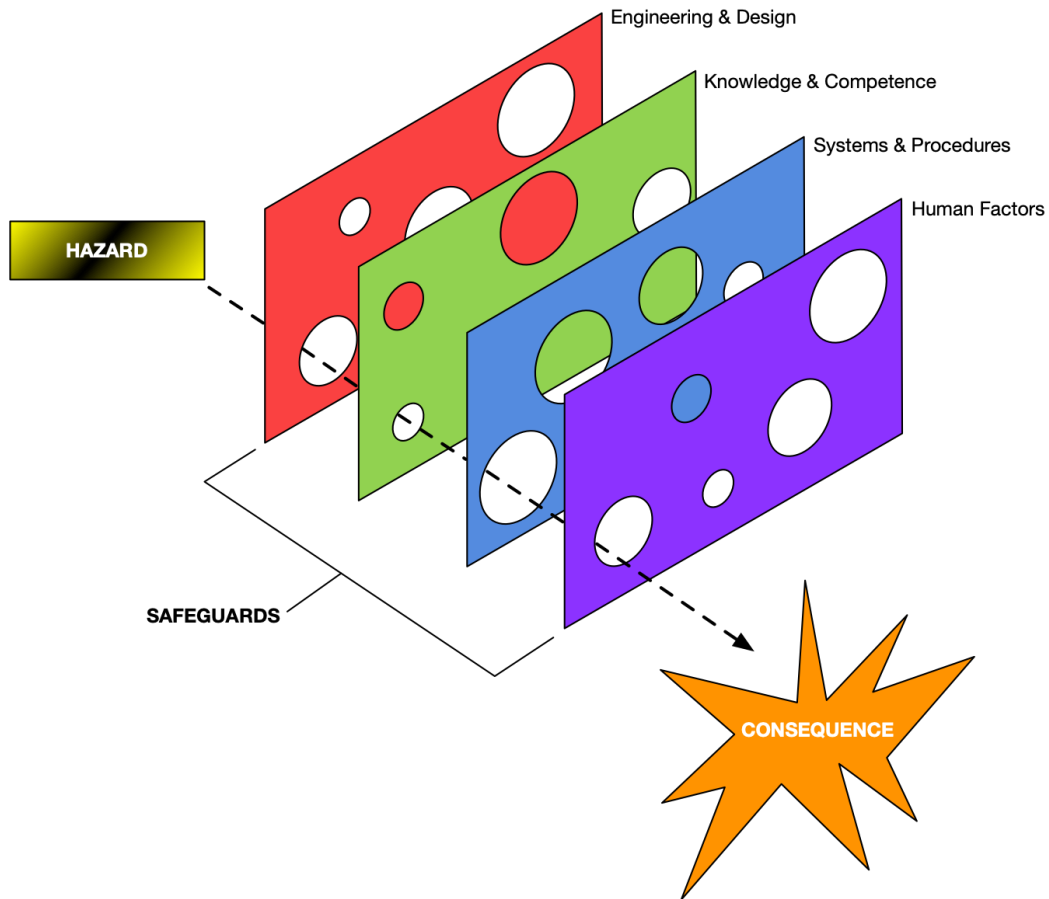
1-2 people impacted	<input type="checkbox"/>
3-7 people impacted	<input type="checkbox"/>
8-15 people impacted	<input type="checkbox"/>
16-50 people impacted	<input type="checkbox"/>
51 or more	<input checked="" type="checkbox"/>

Exposure

Rarely (0.1)	<input type="checkbox"/>
Infrequently (1)	<input type="checkbox"/>
Annually (2)	<input type="checkbox"/>
Quarterly (5)	<input type="checkbox"/>
Monthly (10)	<input type="checkbox"/>
Weekly (25)	<input type="checkbox"/>
Daily (50)	<input type="checkbox"/>
Hourly (100)	<input type="checkbox"/>
Constantly (150)	<input checked="" type="checkbox"/>



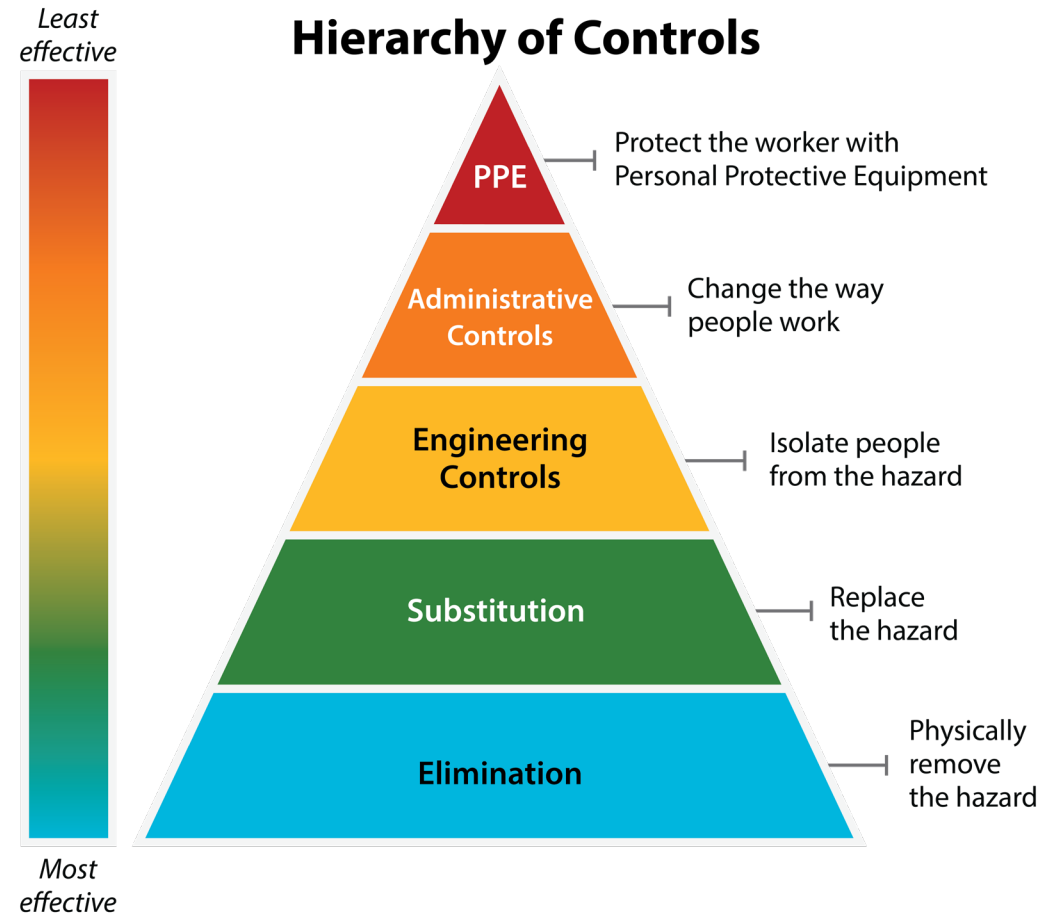
The Swiss Cheese Model



- Multiple controls to prevent a hazard from becoming an incident
- Incidents result from multiple controls failing
- When flaws or weaknesses in each control lines up a hazard becomes an incident
- Safety management systems verify controls are in place and effective



Step 5: Identify Existing & Corresponding Controls



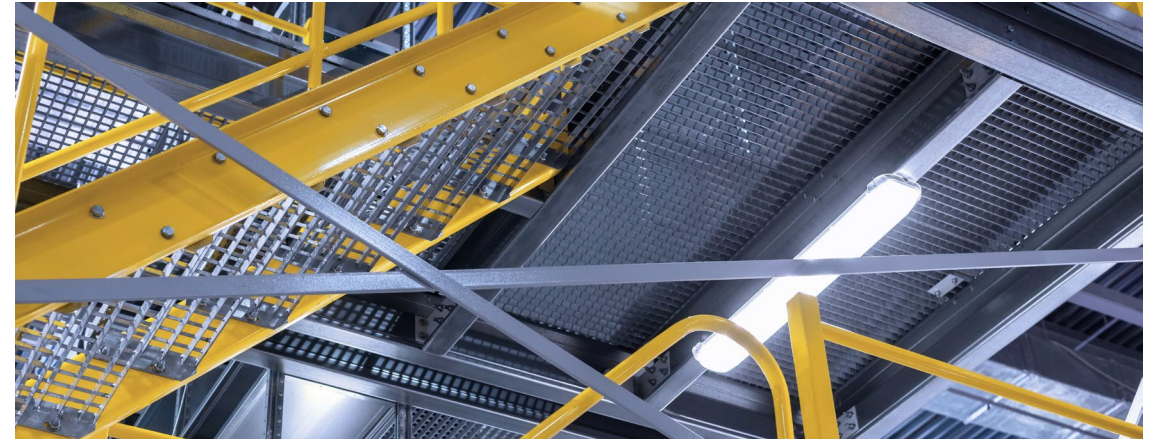
Step 5: Identify Existing & Corresponding Controls

- Active Engineering Controls

- » Adjustable guards
- » Interlocks/light curtains
- » Emergency stop/shutdown systems
- » Fall restraint systems
- » Fire suppression systems
- » Ventilation

- Passive Engineering Controls

- » Fire walls
- » Guardrails
- » Fixed guards
- » Barriers



Step 5: Identify Existing & Corresponding Controls

- Administrative Controls

- » Policies and procedures
- » Lockout-tagout
- » Work instructions
- » Training
- » Audits & inspections
- » Management of Change (MOC)

- Personal Protective Equipment

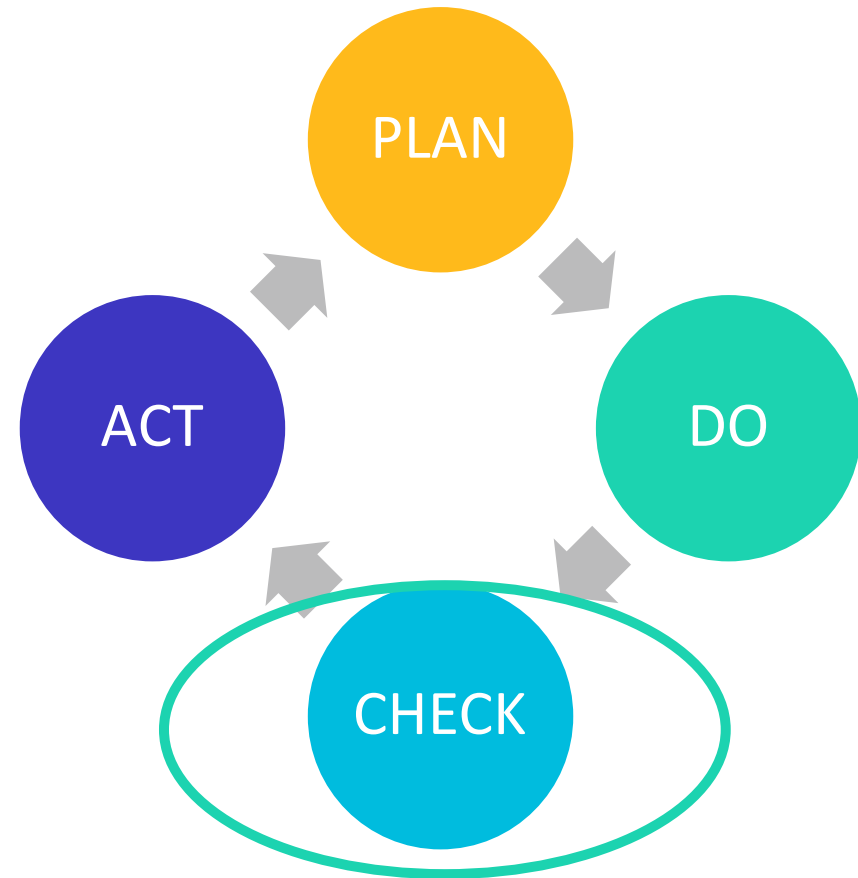
- » Eye protection
- » Respiratory protection
- » Fall arrest systems
- » Arc flash PPE
- » Chemical or cut gloves



Step 6: Review JSAs

- JSA Review Process

- » Evaluate JSAs annually...AT LEAST!
- » Risk based strategy (review higher risk jobs more frequently)
- » Utilize Management of Change (MOC) to update JSAs for equipment/process changes
- » Near-miss & Hazard ID reporting
- » Review JSAs as part of incident investigations
 - Were the hazards identified?
 - Were the controls identified?
 - Were the controls implemented and effective?
 - Were controls verified?



Example JSA

Dashboard / Job Safety Analyses / Job Safety Analysis

Example JSA (Draft) Print Send to Coordinator

Properties Job Safety Analysis

Search... Filter...

Actions ▼ Add

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2 result(s)



**Why are JSAs so
Important anyways?**



CSB Incident Review

- Reviewed 46 CSB Investigation Reports (2010 to 2021)
 - » 14 Incidents (30%)
 - » 23 Fatalities
 - » 99 People Injured
 - » Hazard Analysis – 10 Incidents (71%)
 - » Training & Competency – 10 Incidents (71%)
 - » Mechanical Integrity – 4 Incidents (29%)
 - » Management of Change – 3 Incidents (21%)
 - » Emergency Response – 3 Incidents (21%)
 - » Safety Culture – 3 Incidents (21%)



JSA-Related Incident Scenario

- JSA performed prior to completing replacement-in-kind
- Unexpected addition of job step (removing section of railing)
- Unidentified/unassessed hazard caused severe injuries to worker
- BSEE investigation revealed JSA deficiencies
- Could have been much worse!



Common JSA Failures

- lack of employee/stakeholder participation.
- Failure to apply hierarchy of controls and evaluate residual risk
- failure to consider work hazard interactions.
- no unified framework for risk assessment and inconsistent assessment techniques.
- doesn't account for the cumulative/synergistic characteristics of risks.

The screenshot shows a PubMed Central article page. At the top, there is a navigation bar with the NIH logo and 'National Library of Medicine' text. Below this is a search bar for 'PubMed Central' with a 'Search in PMC' button. The article title is 'Applications, Shortcomings, and New Advances of Job Safety Analysis (JSA): Findings from a Systematic Review' by Fakhradin Ghasemi, Amin Doosti-Irani, and Hamed Aghaei. The page includes a disclaimer, a 'Cite' button, and a 'Background' section starting with 'Job safety analysis (JSA) is a popular technique for hazard identification and risk assessment in workplaces that has been applied across a wide range of industries. This systematic review was conducted to answer four main questions regarding JSA: (1) which sectors and areas have used JSA? (2) What has been the aim of employing JSA? (3) What are the shortcomings of JSA? (4) What are the new advances in the field of JSA?'



Common JSA Failures

- lack of an initial comprehensive list of hazards in the traditional JSA can result in missing many notable hazards.
- JSA does not consider recovery measures (i.e. mitigative controls) needed to bring the system back into the normal state.
- doesn't identify hazards from performing operations out of the predefined time sequence.

The screenshot shows the PubMed Central interface for an article. At the top, the NIH National Library of Medicine logo is visible. Below it, a search bar contains the text 'Search PMC Full-Text Archive' and a 'Search in PMC' button. The article title is 'Applications, Shortcomings, and New Advances of Job Safety Analysis (JSA): Findings from a Systematic Review' by Fakhradin Ghasemi, Amin Doosti-Irani, and Hamed Aghaei. The article is from 'Saf Health Work', 2023 Jun; 14(2): 153-162. The abstract text is visible, starting with 'Job safety analysis (JSA) is a popular technique for hazard identification and risk assessment in workplaces that has been applied across a wide range of industries. This systematic review was conducted to answer four main questions regarding JSA: (1) which sectors and areas have used JSA? (2) What has been the aim of employing JSA? (3) What are the shortcomings of JSA? (4) What are the new advances in the field of JSA?'. The right sidebar contains options for 'OTHER FORMATS' (PDF 1.4M), 'ACTIONS' (Cite, Collections), 'SHARE' (Twitter, Facebook, LinkedIn), and 'RESOURCES' (Similar articles, Cited by other articles, Links to NCBI Databases).



Common JSA Failures

- inability to share & compare JSA findings across worksites/facilities.
- tedious and time-consuming to perform was the most frequent drawback mentioned by studies.

The screenshot shows a PubMed Central article page. At the top, there is a NIH logo and the text 'National Library of Medicine National Center for Biotechnology Information'. Below this is a search bar with 'Search in PMC' and 'Advanced Search | User Guide' options. The article title is 'Applications, Shortcomings, and New Advances of Job Safety Analysis (JSA): Findings from a Systematic Review' by 'Fakhradin Ghasemi, Amin Doosti-Irani, and Hamed Aghaei'. The abstract text is visible: 'Job safety analysis (JSA) is a popular technique for hazard identification and risk assessment in workplaces that has been applied across a wide range of industries. This systematic review was conducted to answer four main questions regarding JSA: (1) which sectors and areas have used JSA? (2) What has been the aim of employing JSA? (3) What are the shortcomings of JSA? (4) What are the new advances in the field of JSA?'. The page also includes a 'Cite' button, 'Collections' button, and social media sharing options.



JSA Best Practices



Build your JSA Team

Get Everyone Involved!

- » EHS supervisors
- » Front-line employees who perform the jobs covered by the JSA you're doing!
- » Employees from other areas or departments who have specific experience or skills relevant to the JSAs



Build your JSA Team

JSA Team Benefits

- » Foster employee engagement
- » Diverse backgrounds and experiences improve risk assessment quality and control effectiveness
- » Ownership and accountability for safety outcomes
- » Stronger safety culture



Bring Your JSAs to Life!

- Not just “checking a box”
- Responsiveness to JSA findings
- Incorporate hazards and controls in procedures and work instructions
 - » Pre-job check
 - » Hazards associated with each job task
 - » Controls associated with each job task
 - » Qualifications required for job task
 - » PPE requirements
- Always refer to JSA when developing corrective actions
 - » Safety committee agenda



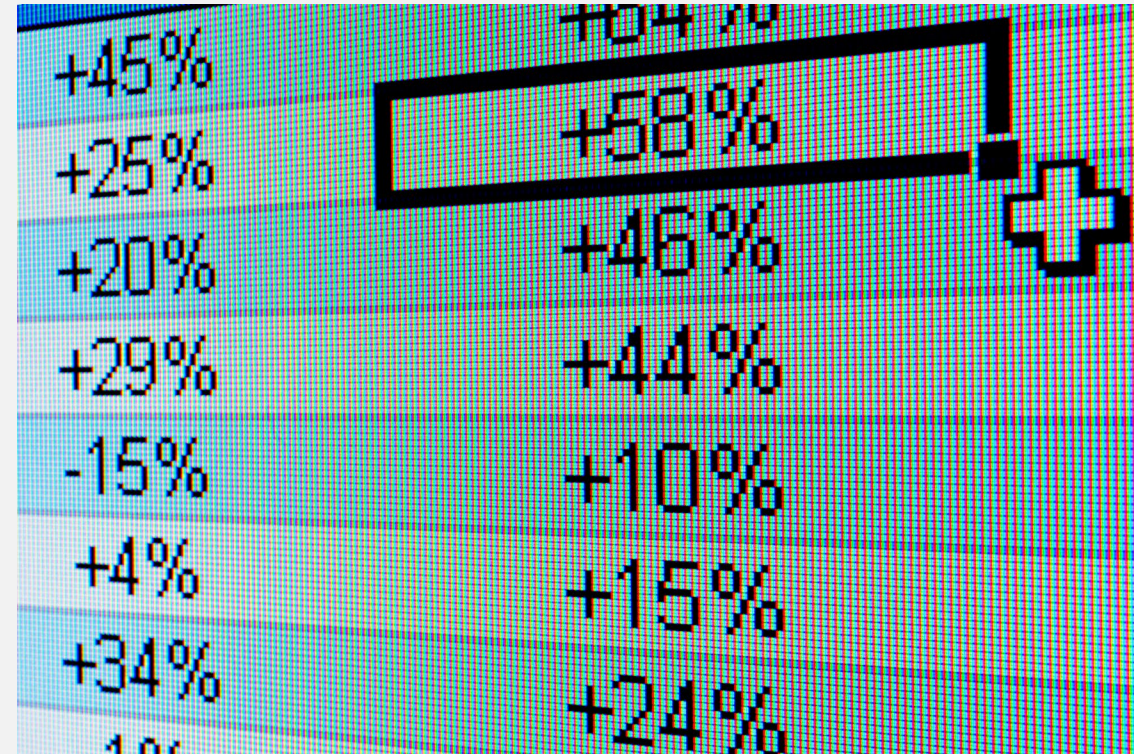
Incorporate JSA into Training!

- Lessons learned
 - » Assign training based on JSA findings
 - » JSA reviews prompt training needs assessment
- Training as a control
 - » Administrative controls
- Training program support
 - » Needs analysis
 - » Alignment between roles and training requirements



Think Outside the Cell!

- JSA format naturally fits with spreadsheet layout, but...
- Spreadsheet shortfalls:
 - » No communication functionality
 - » Corrective action assignment & tracking?
 - » Risk scoring/calculation difficult
 - » Access and versioning
 - » Building/updating master hazard & control libraries
 - » Inter-job and cross-facility standardization of methods & criteria

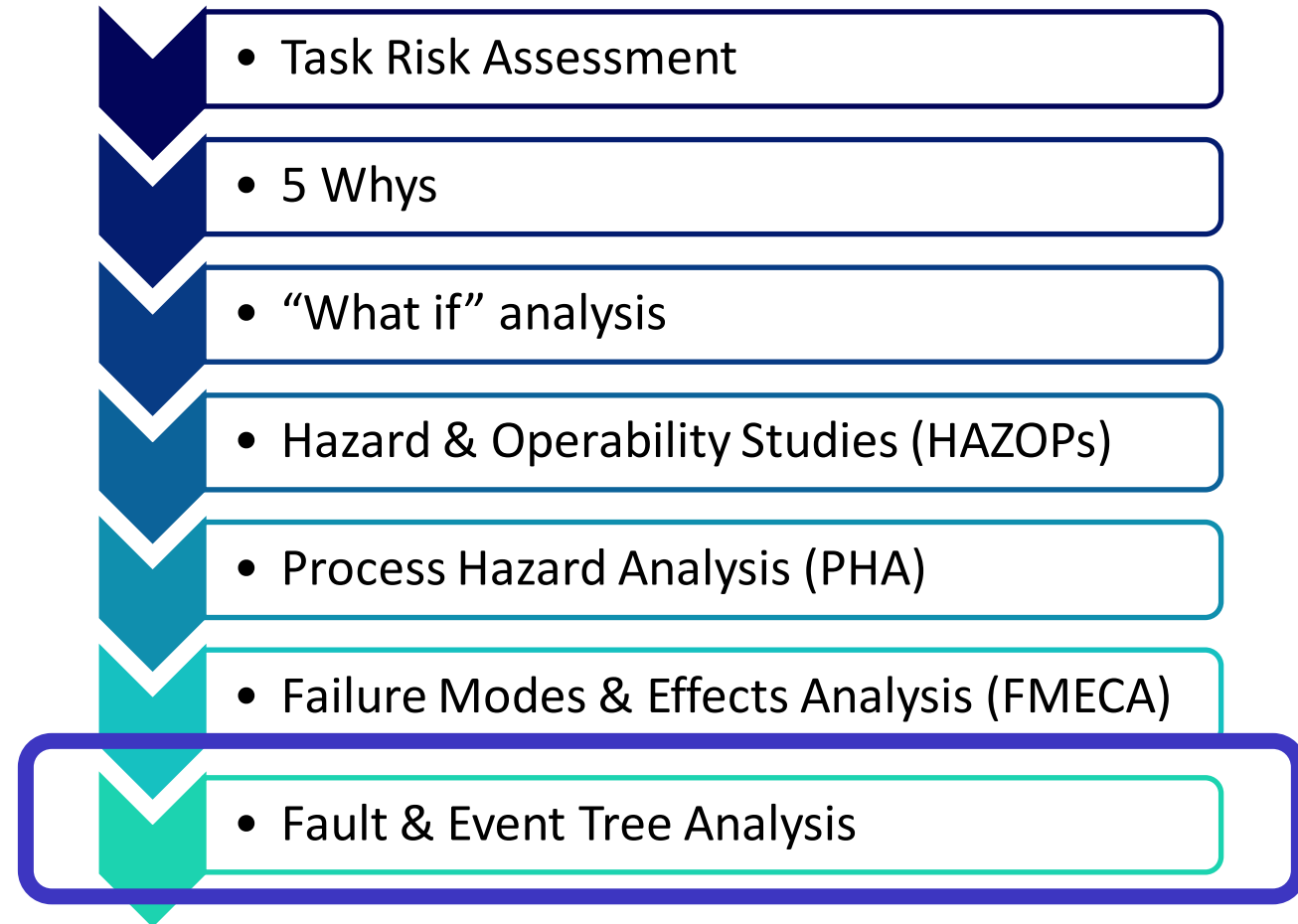


JSA Advanced Risk Assessment Techniques

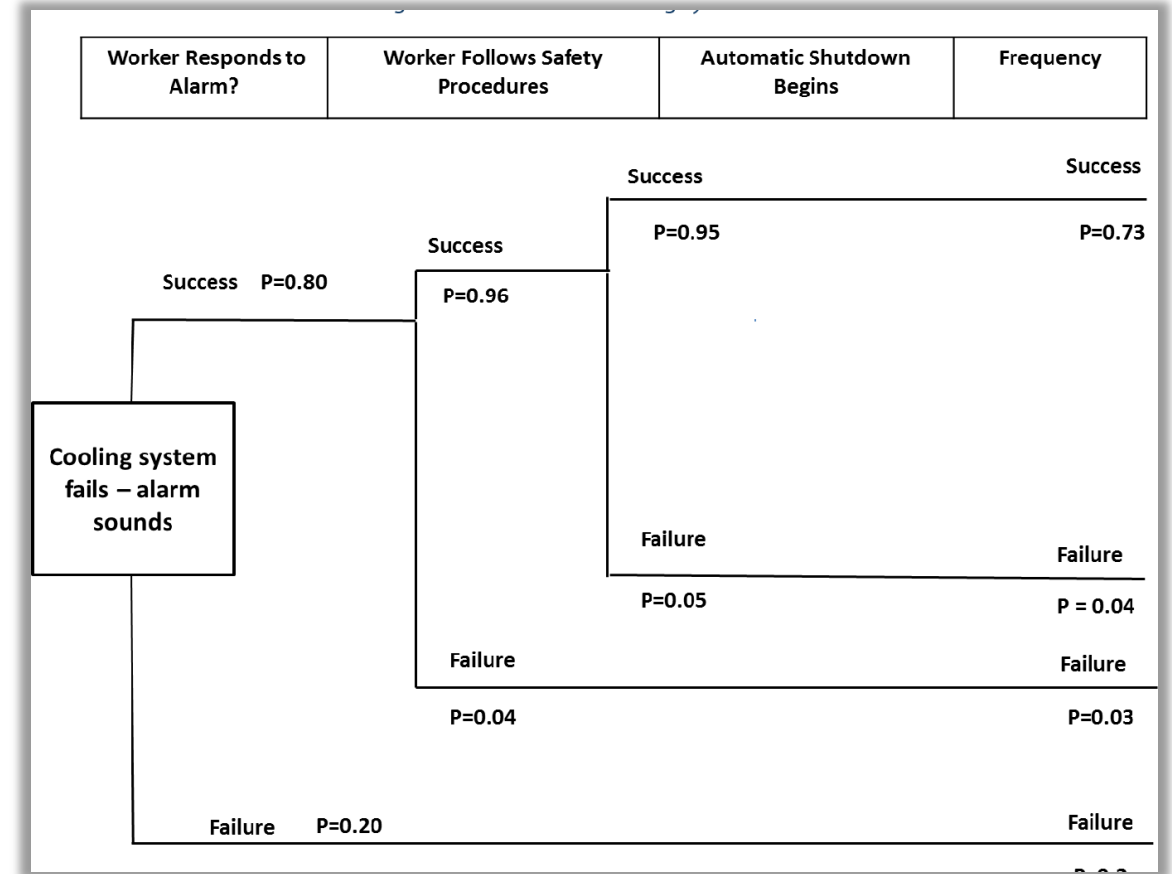
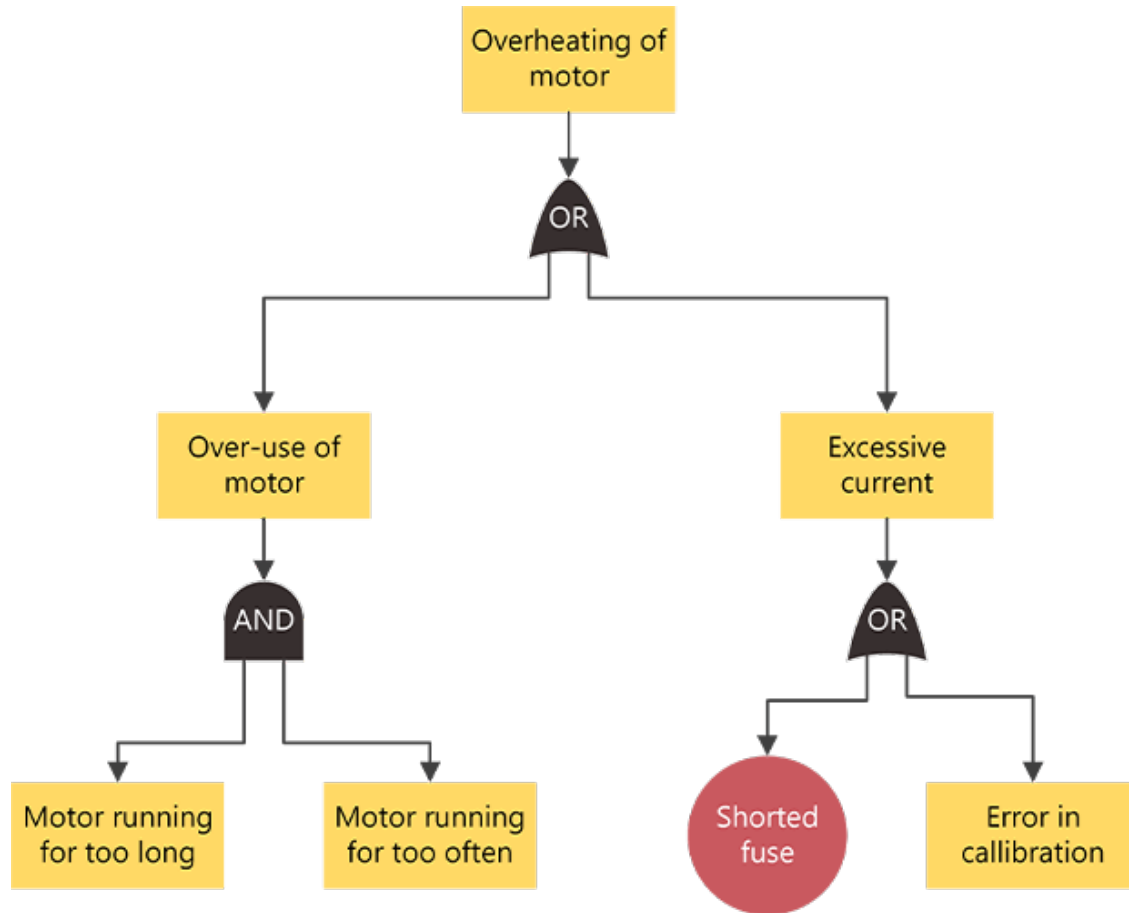


JSA Advanced Risk Assessment Techniques

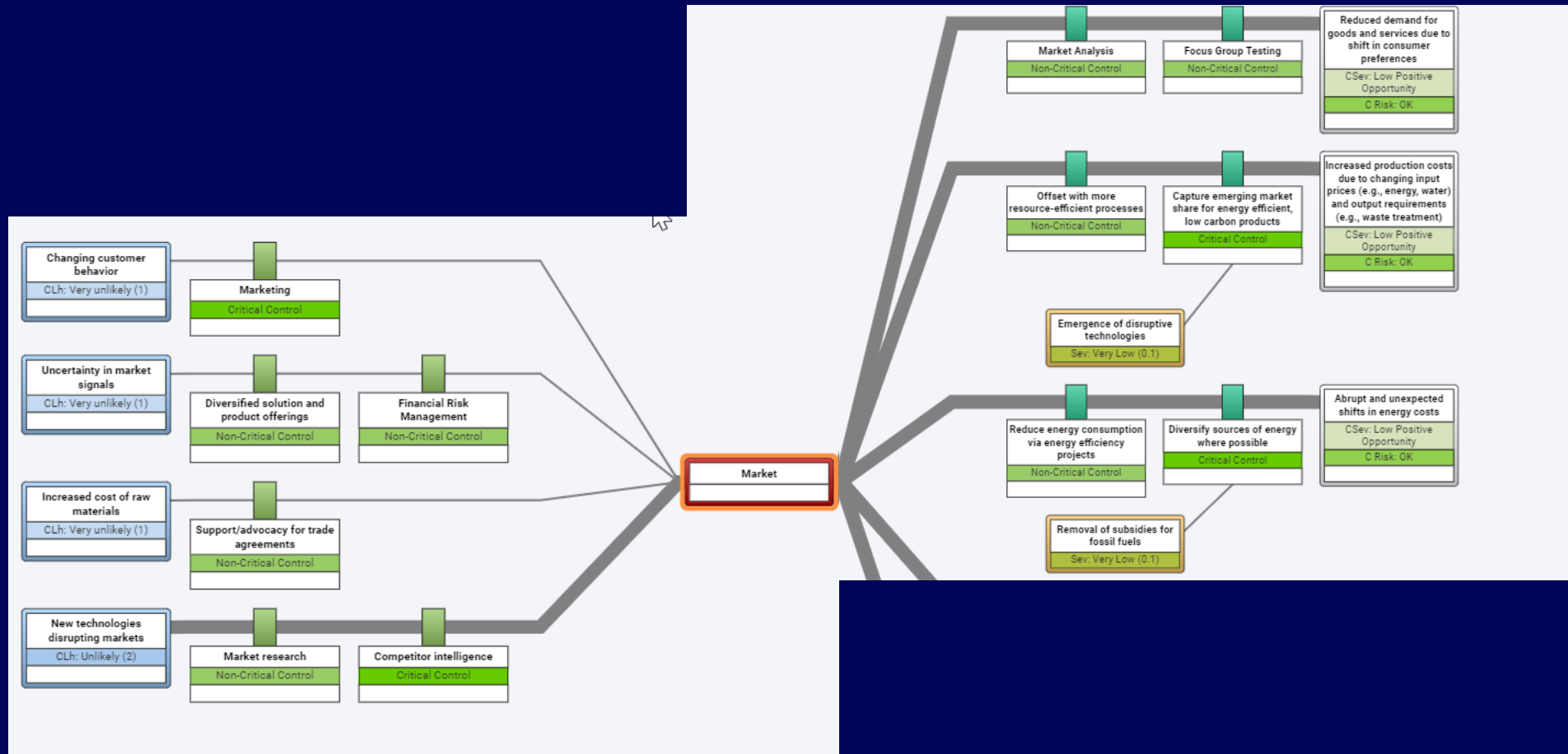
- More complex and high-risk job require more comprehensive, frequent assessment of task risks
- Many risk assessment techniques available
- Choosing the right one dependent on risk level & complexity, desired level of analysis



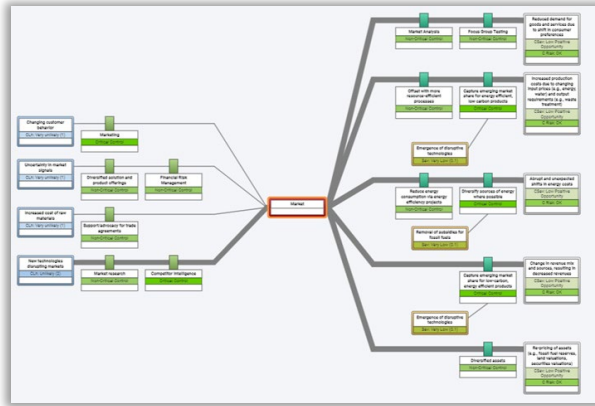
Fault Tree Analysis & Event Tree Analysis: The Before and After of Risk



Bowtie Analysis: The Peak of Risk Assessment & Control



Incorporate Bowtie Data into JSA!



Dashboard / Job Safety Analyses / Job Safety Analysis

Example JSA (Draft)

Properties Job Safety Analysis

Search... Filter...

<input type="checkbox"/>	Task	Activity	Hazard	Target Principal Hazard	Exposure	Likelihood	Severity	People Impacted	Risk	Base Controls	Comments	Mitigated Risk
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<input type="checkbox"/>	Task 2	<input type="checkbox"/> Routine	-	-	<input type="checkbox"/> Annually (2)	<input type="checkbox"/> Almost Certain	<input type="checkbox"/> First Aid / LTI	-	<input type="checkbox"/> 200			<input type="checkbox"/> 200

2 result(s)



JSA Takeaways



JSA Summary



JSA is a CRITICAL tool for workplace safety, providing safe work instructions, risk/hazard assessment and control information, training needs analysis tools, and documentation



Applying JSAs as living documents and not just “checking the box” is how to get value from them



Collaboration is key! Build your JSA team, secure top-down AND bottom-up engagement with JSA programs



JSA Summary



Utilizing paper and spreadsheets for Job Safety Analysis (JSAs) leads to inefficiencies, causing delays in data collection and increasing the likelihood of errors, which results in an increase of incidents and injuries



Inaccurate and inconsistent risk scoring, hazard definitions, other JSA practices result in incorrect risk calculations, unreliable risk assessments, and ineffective controls

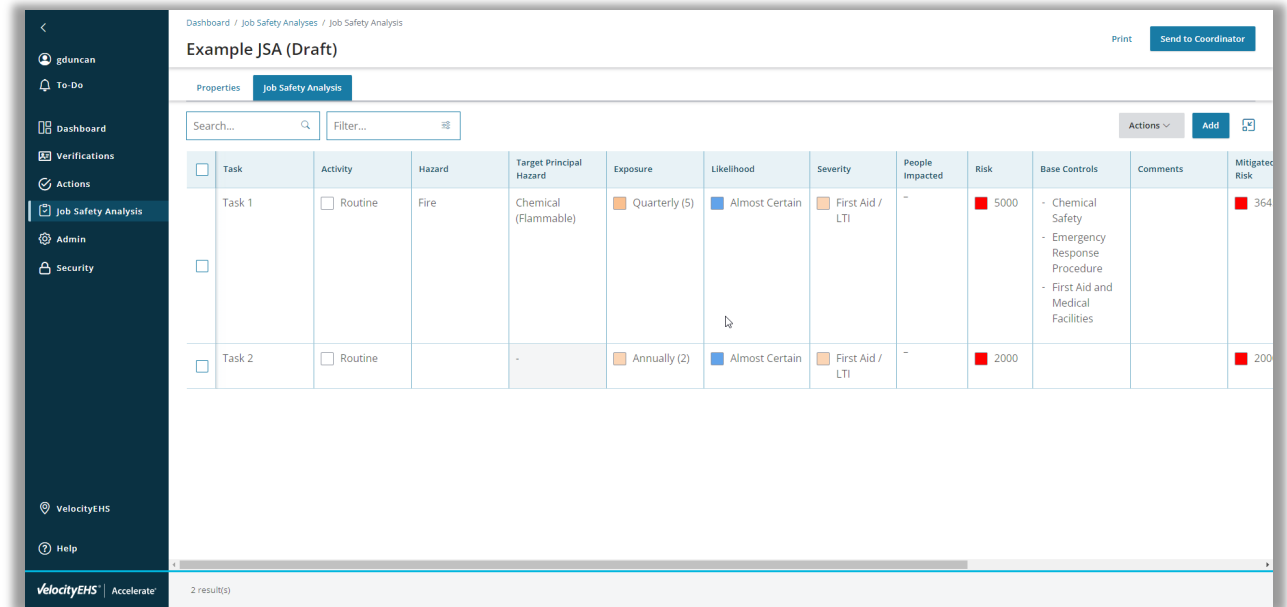


The absence of effective JSA results in a reactive approach to safety just waiting for unanticipated incidents to occur rather than fostering a proactive safety culture rooted in continuous improvement



JSA Systems & Tools

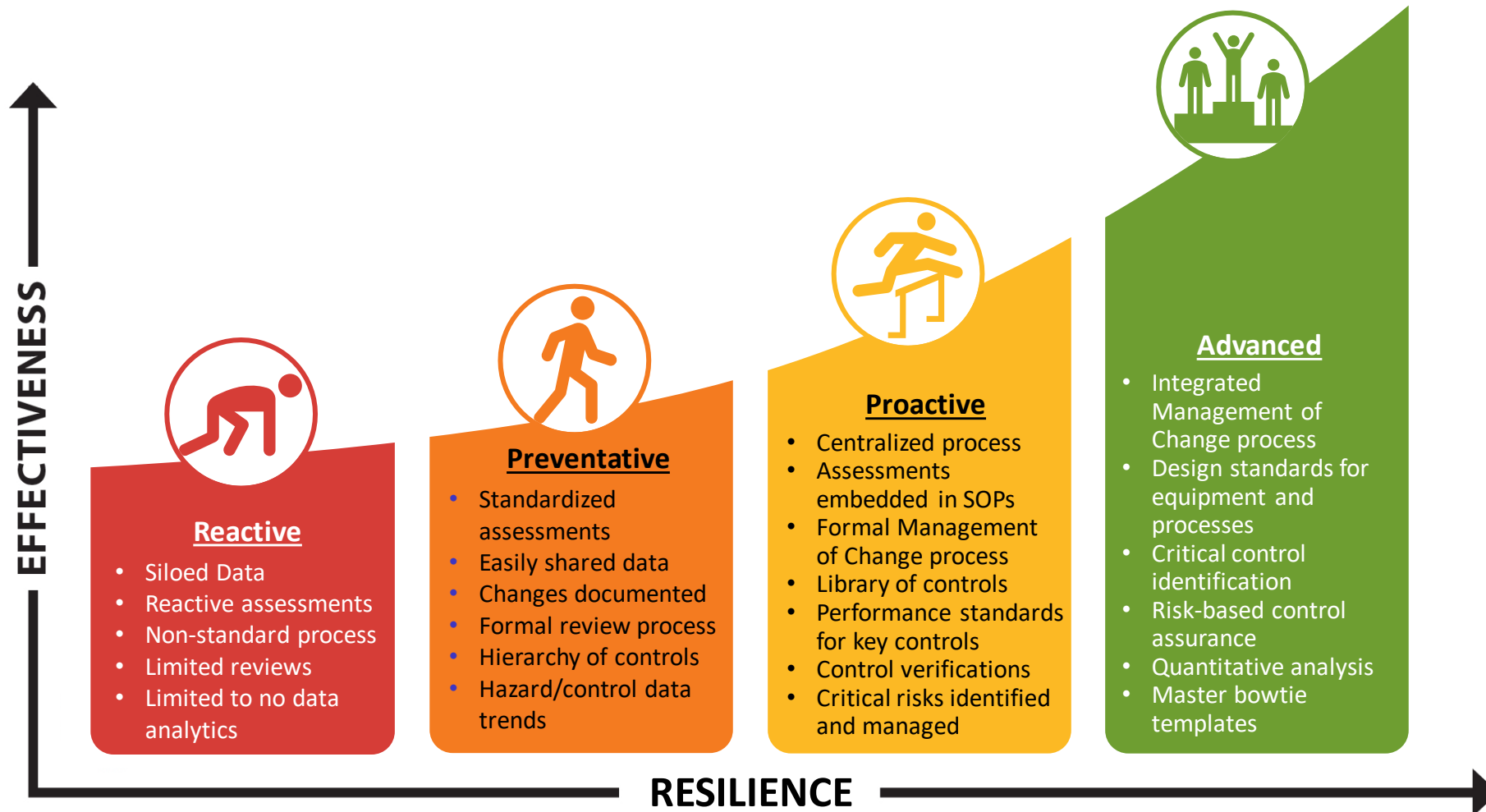
- Operational risk
 - » JSA
 - » Hazard studies
 - » Risk assessments
 - » Bowtie analysis
- Safety
 - » Incident management
 - » Audit, Inspection, & Observation
 - » Training
 - » Chemical management/hazard communication
- Additional EHS functions?



The screenshot displays a software interface for Job Safety Analysis (JSA). The main content area is titled "Example JSA (Draft)" and contains a table with the following columns: Task, Activity, Hazard, Target Principal Hazard, Exposure, Likelihood, Severity, People Impacted, Risk, Base Controls, Comments, and Mitigate Risk. The table lists two tasks: Task 1 and Task 2. Task 1 is associated with a "Fire" hazard and a risk of 5000, while Task 2 is associated with a risk of 2000. The interface also includes a sidebar with navigation options like "Dashboard", "Verifications", "Actions", "Job Safety Analysis", "Admin", and "Security".

Task	Activity	Hazard	Target Principal Hazard	Exposure	Likelihood	Severity	People Impacted	Risk	Base Controls	Comments	Mitigate Risk
Task 1	<input type="checkbox"/> Routine	Fire	Chemical (Flammable)	Quarterly (5)	Almost Certain	First Aid / LTI	-	5000	- Chemical Safety - Emergency Response Procedure - First Aid and Medical Facilities		364
Task 2	<input type="checkbox"/> Routine		-	Annually (2)	Almost Certain	First Aid / LTI	-	2000			200

Operational Risk Maturity Model

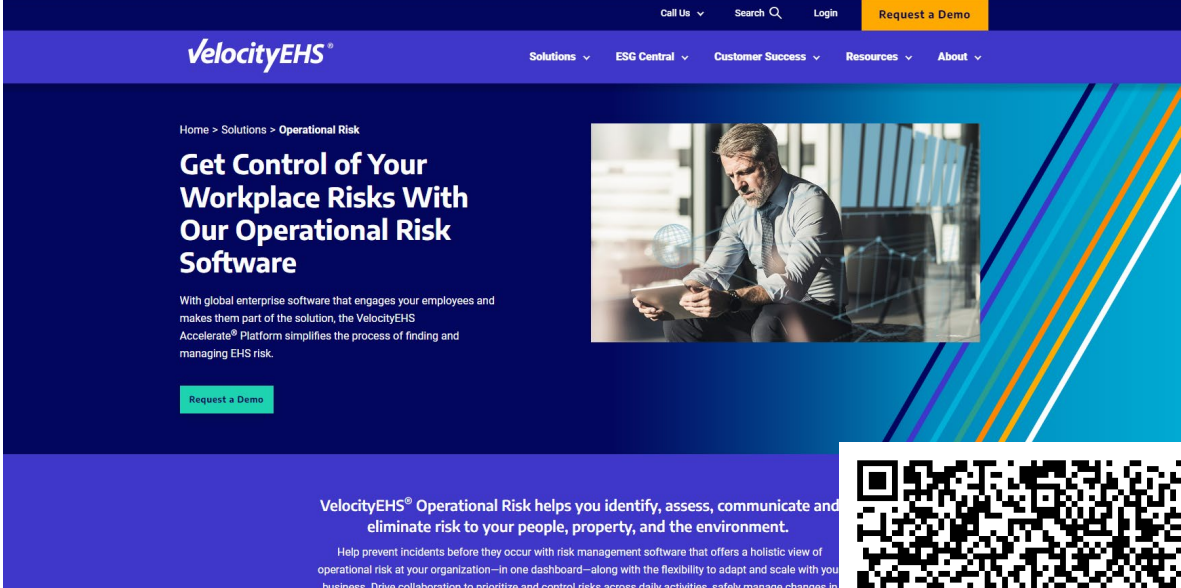


The VelocityEHS Operational Risk Solution

From simple JSAs to sophisticated hazard studies and risk analysis techniques, and much more, VelocityEHS Operational Risk gives you the tools to identify, assess, communicate and control risks to your people, your organization, and the environment.

Core Capabilities

- Job safety analysis (JSA)
- Management of Change (MOC)
- Hazard Studies
- Risk Analysis
- Risk Bowties & Master Bowties
- Critical Control Verification
- Master Risk Controls



Home > Solutions > Operational Risk

Get Control of Your Workplace Risks With Our Operational Risk Software

With global enterprise software that engages your employees and makes them part of the solution, the VelocityEHS Accelerate® Platform simplifies the process of finding and managing EHS risk.

[Request a Demo](#)

VelocityEHS® Operational Risk helps you identify, assess, communicate and eliminate risk to your people, property, and the environment.

Help prevent incidents before they occur with risk management software that offers a holistic view of operational risk at your organization—in one dashboard—along with the flexibility to adapt and scale with your business. Drive collaboration to prioritize and control risks across daily activities, safely manage changes in





OUR MISSION

Making Workplaces Safer and More Sustainable

*velocity*EHS®



Thanks for attending!

Scan the QR code for the slide deck and additional resources.



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Questions?



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