JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

LINE OF FIRE RISK (INVISIBLE RISK) REDUCTION

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ABSTRACT

In Safety we can identify the risk and provide preventive plan, contingency plan or mitigation plan which can reduce but it is impossible to reduce the risk completely and ensure 100% mitigated safety process or product We have plenty of safety risk in the industries, in that most of the risk is visible and it occurs mostly due to ignorance but it's easy to have good mitigation actions for those risk like working at height, suspended load, confine spaces and so-on, but there is risk which is mostly invisible/unknown it's just same as other risk which exist but not visible and this makes me to choose the project of the topic " Risk of Line of Fire(The Invisible Risk)" and plan measure the risk level and try to bring some methodologies to control this risk. Line-of-fire safety is a hazard of dangerous work. Injuries can occur when the path of a moving object or the release of stored energy meets a person. A blended-learning training approach on this topic can keep your employees aware.

Keywords: Safety, Hidden safety, Design Safety and Process Safety

1. STAYING OUT OF HARM'S WAY

Operating safely in compliance with regulations is one of the core values of most American manufacturing businesses. To keep their teams safe, those in this industry train, observe, and avoid line-of-fire-related hazards in the workplace. Simply put, it means to stay out of the path of a moving object. Safety professionals take this subject seriously. They do what they can to keep employees from being struck, pinched, pierced, caught, or crushed between moving objects. Adding an electric, blended-learning approach to this (and other safety-related subjects) might help inspire a renewed awareness and improved safety record.

2. OBJECTIVES

Increase awareness of the Line of Fire (Invisible Risk)

Provide guidance on how to support compliance line of fire with safety risk

Enable discussions (inside the industries) on how to prevent Line of Fire risks in planning, design, and execution

Human Performance recognizes people are key to solutions – that they know their job best and understand both how effective our barriers are for managing risk and what can be done to prevent a mistake leading to a life-changing injury – how we can 'fail safely'. This risk was identified by the Oil and Energy Industry and try to get the data analysis on this It has not be align only with O&G but also all the industries like renewable, machineries, Production, textile, construction and so on.

3.LINE OF FIRE DEFINE

When we work in an environment that can experience hazards regularly, it is referred to as working in the "line of fire". Every job is different and requires a different type of scenario that may be what is causing us to be in harm's way. Every employee who is working in this type of job situation should always be fully educated about the hazards that they can face.

What Does It Mean to Be in the "Line of Fire"?

We have many things around we that can cause harm. Working in the line of fire is a term that is used to say that we have hazards around us that we need to be careful of. Many injuries can occur from these types of jobs, and it is important that we know the ways to protect yourself.

"Line of Fire" Injuries That Can Happen

Working in the line of fire puts we at risk for a number of injuries that can happen. These incidents are put into different categories, known as caught-in or between, struck-by, and released energy incidents. These injuries can vary from minor, serious, and even fatal. That is why it is so important to make sure that we always follow the protocol when working.

Released Energy Incidents

Released energy incidents are when someone is burned or injured from a job they must do while working. These types of injuries can vary from their causes. Some of the major incidents that can happen from released energy while on the worksite are:

Hot steam releasing from a pipe causing burns
Flames shooting from a malfunctioning engine causing burns
Caught-In or Between Incidents

Caught-in and caught-between incidents are some of the most common incidents that can happen while on a worksite. There can be a varying array of things that can happen to both we and a person standing by. Some examples of the causes of these injuries are:

Getting caught between machinery and a wall
Putting hands, feet, or other body parts too close to moving gears
Struck-By Incidents

Getting struck by major equipment, falling objects, or swinging material can cause a struck-by incident on a construction site. This is one reason that it is important to have areas that these instances are more common in blocked off. There are some instances that we can't avoid and here are some of the reasons people get struck-by things on the job.

The operator of a vehicle or equipment couldn't see the bystander
Equipment or materials falling from above head

4.LINE OF FIRE SAFETY TALK

The term “line of fire” is very common when talking about the hazards of a work task. Depending on the work being completed, there may be many different lines of fire or there could be very few. It is important to understand what the “line of fire” is and how to avoid being in it to avoid injuries.

What is the “Line of Fire”?

A simple definition of “line of fire” is being in harm’s way. Line of fire injuries occur when the path of a moving object or the release of hazardous energy intersects with an individual’s body.

Three major categories of line of fire incidents are caught-in or between incidents, struck-by incidents, and released energy incidents. There are many specific examples of hazards for each of these categories. A few quick examples for each category:

Caught-in or between- A construction worker is standing between a wall and an excavator. When the excavator spins around the counterweight pins the worker against the wall. Another example would be a worker placing his hand too close to a rotating gear and gets it pulled into the gear.

Struck-by- A pedestrian struck by a moving vehicle or an object falling from a higher level striking a worker below are examples of struck-by incidents.

Released energy- A pipe releasing hot steam from a valve that is being removed or a flame shooting out of a malfunctioning engine are examples of released energy.

OSHA Regulations/ compliance/ Safety Acts

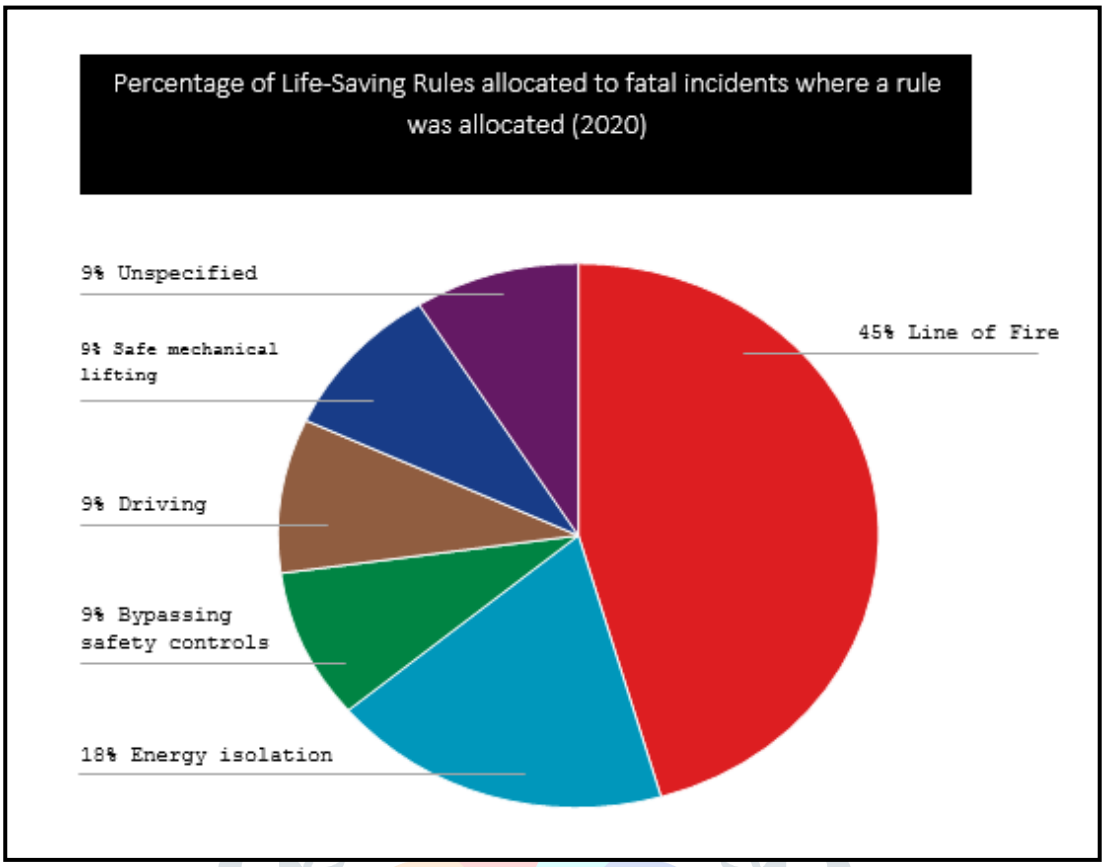
There are many things that can happen to someone working in a construction position. That is why it is important to have the right training and certifications before beginning a job. OSHA, Occupational Safety and Health Administration is a company that is there to help out the right steps into action to keep people safe.

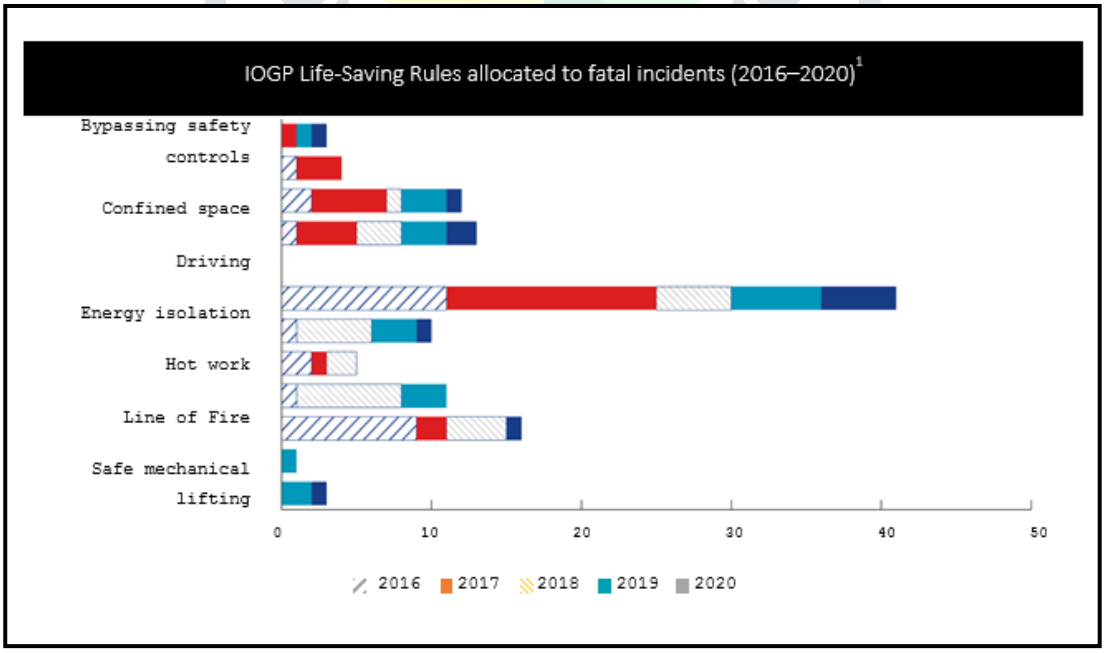
Some of the safety protocols that they have are:

Scaffold platforms always have Toe boards, Guardrails, and Midrails
Use safety harnesses/safety nets for employees who work from high elevations
Only use ladders that are tall enough to reach the area we are working on
Always resolve slippery stairwells to prevent slipping
There should always be a safe way to exit a trench
Never move a load on a crane directly over individuals
There should be a visible written spill control plan
All employees should know how to read and translate SDS
All chemicals stored at the business should have a SDS
All forklift operators must be properly trained, certified, and capable
No horseplay when operating major equipment
All workers should wear proper PPE at all times

5.LINE OF FIRE DATA AS PER THE 2020 AND 2021

5.1 IOGP SHARED THE DATA FOR THE LINE OF FIRE IN OIL AND GAS INDUSTRIES 2020





6. METHODOLOGY

The Following methodology has been adopted in preparing this project work: -

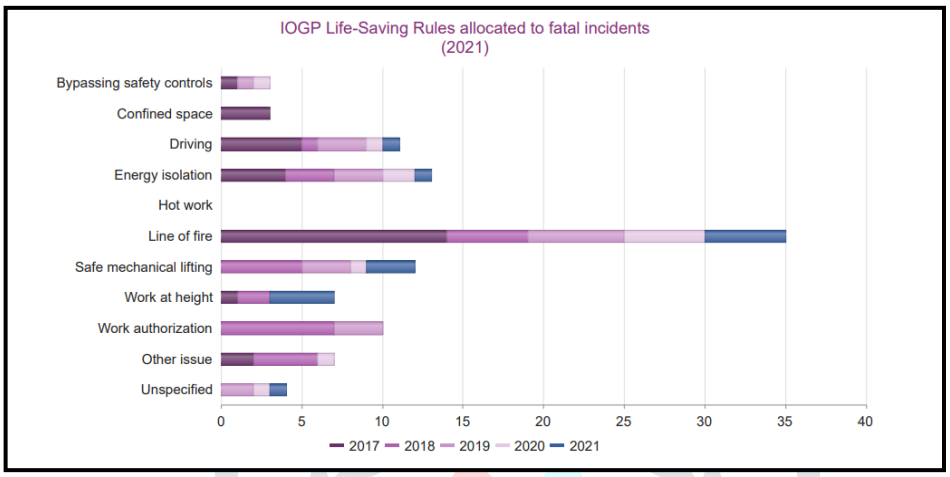
By discussions with the senior officials in the company

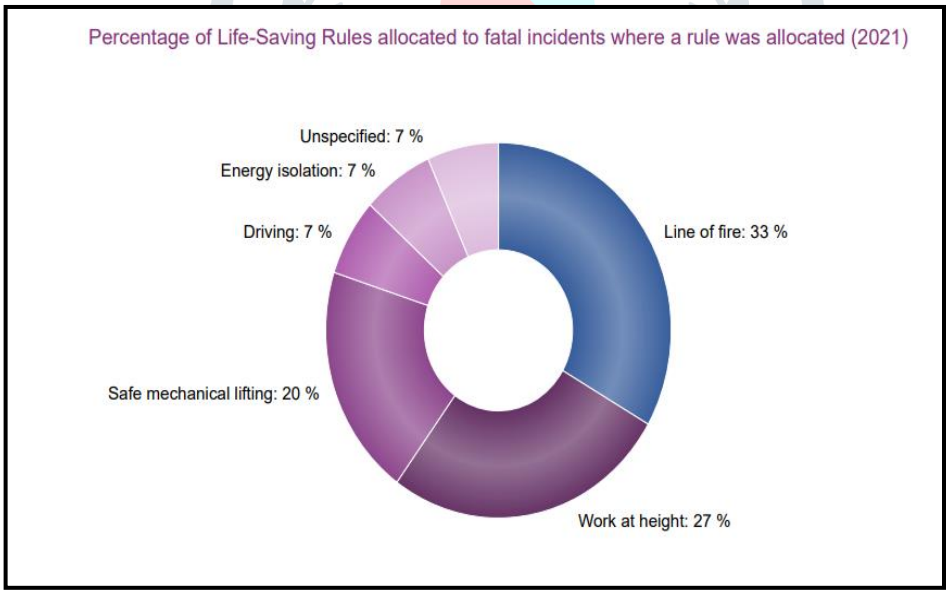
Site inspections and interactions with the agencies Safety Checkpoints Report data as for past **135** fatalities in the industry related to Line of Fire (2016–2020) [1]

40% or more of High Potential Incidents (HPI) were related to Line of Fire for 2020.

In the last **10 years**, **376 people** might still be alive if the Line of Fire Risk identified in O&G had been followed

7. LINE OF FIRE INDUSTRY 2021 by IOGP





Line of fire in 2021 is 33% but still it will include the incident so of unspecified, energy isolation, mechanical lifting which leads to increase in line of fire % and in all the case comes for an important key issue is no awareness of this invisible risk.

8.QUESTIONERS REGARDING LINE OF FIRE WITH FRONT-LINE TEAMS

What are some of the critical or additional controls that might be needed e.g. visual/auditory indications to make sure we 'fail safely'?

How can we make sure we are constantly learning how to better communicate, address and improve how we manage Line of Fire risks?

How can risks assessments define how people will be protected from Line of Fire hazards (e.g. separation of people and plant, high impact gloves etc)?

Which of our hazardous activities does the Line of Fire apply to (think of stored energy, moving parts and objects that can move or fall)?

How can we identify the 'unseen' (many Line of Fire hazards are invisible; electricity, pressure, tension, unexpected centre of gravity)?

How do leaders create an environment that enables the job to be set up safely with the right hierarchy of controls to manage Line of Fire risks?

What makes it difficult to comply with the Line of Fire Rule?

What are the opportunities to design out Line of Fire risks?

How do we make sure Line of Fire hazards are managed with barriers in place and working as intended i.e. what are the questions we should ask ourselves before we start work?

Try to Find any invisible risk in process?

9. CASE STUDY

9.1 PRESSURIZED EQUIPMENT

What happened?

A worker was struck and fatally injured by a piece of temporary hose assembly whilst transferring water as part fracturing activities

Why it happened?

The worker used the discharge side of the pump to troubleshoot the water pumping issues. The 90-degree elbow pulled free from the external side of the clamp on the discharge of the pump and was propelled at high velocity fatally injuring the worker who was standing in the path of the propelled assembly.

Risk: **1 FATALITY** could have been avoided if 'Line of Fire' had been considered

9.2. PRESSURIZED EQUIPMENT

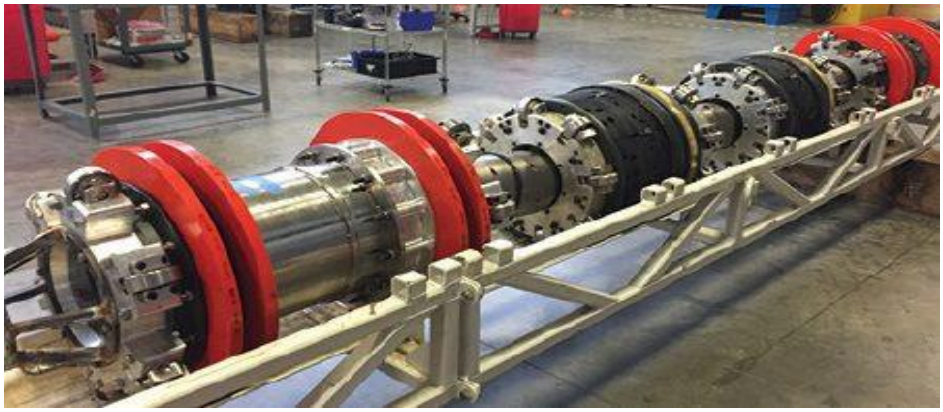
What happened?

In preparation for welding into a naphtha line, temporary isolation plugs were installed before hot work started. While the contractor site supervisor was taking measurements in the vicinity of the open line ends, the plug from the pipeline end blew out and hit the injured person. The worker passed away two days later.

Why it happened?

Over time the pressure in the line kept increasing unnoticed until the pressure in the line was more than the 'holding' pressure of the isolation plug. This led to the plug blowing out and hitting the injured person. This over pressure scenario was unidentified in the risk assessment.

Risk: **1 FATALITY** could have been avoided if 'Line of Fire' had been considered



9.3 LIFTING AND HOISTING

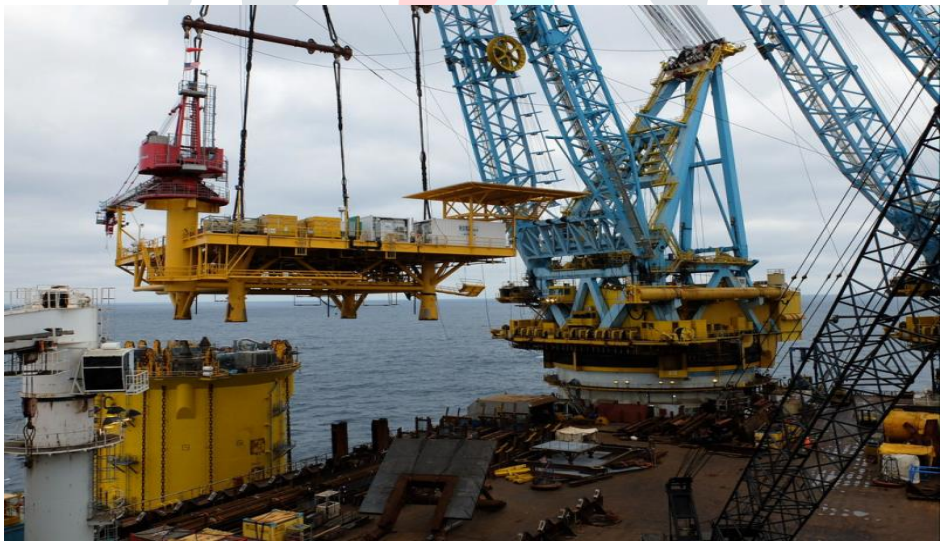
What happened?

A worker was fatally injured after being struck by a skid mounted load during truck loading operations at a well site.

Why it happened?

The load was not secured prior to being disconnected from the crane. A roller at the back of the trailer facilitated a rapid movement of the load, once the centre of gravity moved beyond the end of the trailer. This reduced the chance for the load handler (the injured person) to escape from the Line of Fire, resulting in a fatality.

Risk: **1 FATALITY** could have been avoided if 'Line of Fire' had been considered



9.4 TRANSPORTING VEHICLE

What happened?

A truck used for transporting workers, water and equipment was parked at a worksite with the engine still running. During a break, workers approached the truck to get water. All workers but one return to their work. This worker had collected sandbags from the truck and was preparing the bags for use while sitting next to the truck. The driver did not notice him, and without performing any walk-around, started the truck, fatally running over the worker.

Why it happened?

Line of fire hazards are not always obvious or constant and can be introduced as the task progresses. At all times individuals continually monitor their surroundings and position themselves to avoid being in the line of fire. This includes ensuring you are visible to vehicle drivers and equipment operators. Individuals recognise when they create a line of fire hazard and put others or themselves in the line of fire

Risk: **5 FATALITIES** could have been avoided if 'Line of Fire' had been considered

9.5. LIFTING OPERATIONS

What Happened?

During removal of roof panels from a turbine enclosure a 3.5kg, 600mm long scaffold board (used as a 'glut' to provide clearance between a panel and structural beam) dislodged, falling 5.8m to the landing below. The falling board impacted a member of another work party below on the head. The worker was treated at the facility medical centre before being transferred to a hospital for further medical assessment and treatment. Six stitches were required to close the laceration.

Why did it Happen?

The scaffold design / installation did not incorporate infill protection.

Work area was inspected prior to work commencing and glut being put in place -dropped object risk not identified.

An unsecured packing (glut) was installed beneath the roof panel at height.

Adjacent work team was unaware of potential dropped objects.

At the moment of impact, the worker was not wearing a helmet because they had temporarily removed it to fit a face shield.

Risk: **1 Serious injury** could have been avoided if 'Line of Fire' had been considered

10. CONCLUSION

We identified there is a hidden risk on the safety over industries and we need to ensure that risk to be mitigated and ensure the proper actions take place and need to bring the awareness of the Line of Fire to all the industries.

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