International Association of Drilling Contractors

Definition of a Serious Injury and Fatality

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1 Introduction

This document serves as a practical guide to help IADC members assess and identify Serious Injury and Fatality (SIF) events and potential events. Its purpose is to strengthen the understanding of what constitutes a SIF and to ensure our focus remains on the incidents and exposures that truly have the potential for life-ending/altering outcomes. It is important to recognize that not all SIFs are created equally**.** The severity potential, exposure frequency, and real-world likelihood of a serious outcome can vary greatly from one event to another. Therefore, this guidance emphasizes a balanced, realistic approach to evaluating SIF potential—one that looks beyond theoretical possibilities and considers real world conditions and context surrounding each event.

By applying this approach, we aim to improve the quality and consistency of SIF reporting, prioritize resources toward the highest-risk scenarios, and continue building a culture that learns from these types of events.

The IADC definitions are similar to IOGP's Fatality & Permanent Impairment (FPI) definition to simplify reporting.

2 What is a SIF?

A SIF is an incident that is life-threatening, life-altering, or fatal.

2.1 SIF Actual

Fatal – Work-related fatal injury or illness

Life-Altering – A direct work-related injury outcome that prevents a return to the person's previous (pre-incident) whole person function as a result of an acute, single incident resulting in any of the following:

- Permanent loss of body parts
    - Amputations
        - Amputations (involving bone) excludes distal phalanx.
        - Excludes distal phalanx unless thumb, index or great toe.
        - Frequently Asked Questions
            - Q: If the amputation of a distal phalanx includes more than one finger that is not a thumb or index finger, would this be considered a SIF?

- A: No, the multiple amputation of distal phalanges would not count as a SIF unless it included the thumb or index finger. On the foot, it would not count unless it included the great toe.

- Loss of eye(s)
- Loss of internal organs e.g. kidney, spleen
- Loss of facial structures, for example: nose, ears, leading to disfigurement
- Loss of genitalia or other sexual organs
- Successful use of limb prosthesis to improve function does not negate a permanent impairment definition.
- Permanent reduction of organ's physiological function
- Permanent reduction in skin and musculoskeletal function
- Permanent reduction in cognitive function
- Brain injury with ongoing impact to emotional regulation, speech, memory, or another cognitive dysfunction

On a case-by-case basis, when diagnosis of permanent impairment is unclear, a medical professional opinion should be used to determine permanent impairment.

- Eye injury with loss of vision
- Bowel injury requiring permanent stoma
- Spinal injury requiring use of wheelchair
- Brain injury causing epilepsy (recurrent seizures)
- Heart injury with impaired exertion tolerance / measurable loss of function
- Lung injury, including inhalation, with impaired exertion tolerance/measurable loss of function.
- Loss of smell that creates a safety concern or significant personal impact
- Loss of hearing or persistent tinnitus (ear ringing) post injury after exposure to a blast
- Post injury complex pain disorders with uncontrolled pain and/or disrupted nerve and musculoskeletal function

- Genital or other sexual organ injury leading to loss of function

2.2 SIF Potential

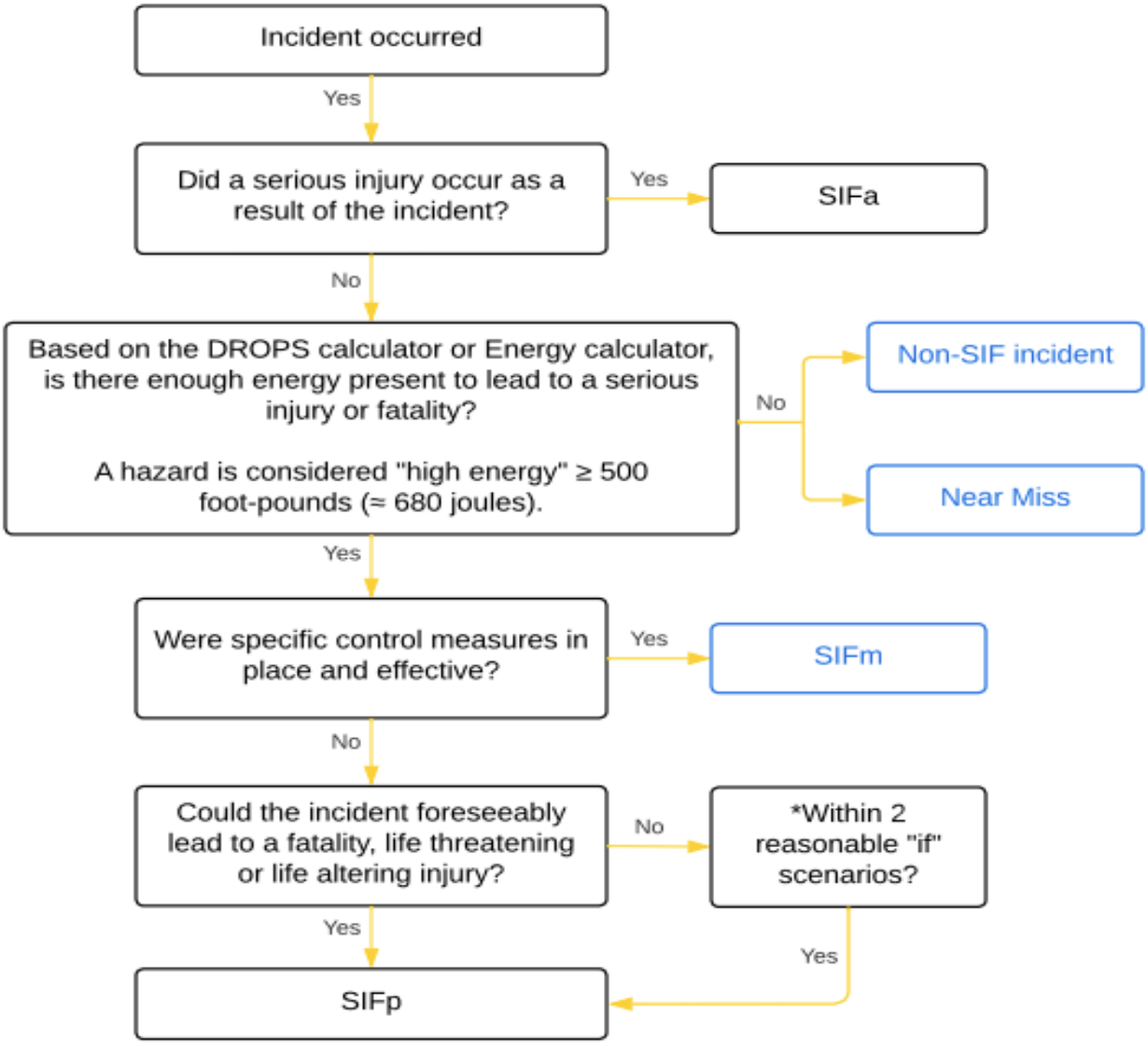
An incident or near miss that could have realistically resulted in a fatality or life-altering injury.

While the SIF definition is similar to the IOGP FPI definition, users of these SIF definitions should be aware that they do not fully align with the IOGP FPI definition.

2.3 Summary of Key Differences

- Excludes mental health conditions, except in cases directly associated with an acute brain injury.
- The specific treatment of amputations involving joints other than the thumb, index finger, or great toe.
    - While such injuries can have lasting effects on affected employees, they are not considered life-threatening or as having a significant long-term impact on overall quality of life under these definitions.
- The absence of a 180-day return-to-work criterion.
    - This exclusion reflects the recognition that an employee's ability to return to work is often influenced by multiple factors unrelated to the actual severity of the injury.

3 SIF Decision Tree



Hazard Observation- potential risk observed before an incident occurs.

Near Miss- an unplanned incident occurred, did not result in harm, injury or damage

SIFa- an incident that is life-threatening, life-altering, or fatal.

SIFp- an incident or near miss that could have realistically resulted in a fatality or life-altering injury.

SIFm- high or hazardous energy was present but a SIFp did not occur because of the presence of controls.

*Note: The two- "if" scenario test is used to assess the reasonableness of classifying an event as a potential SIF. For example, in a dropped-object incident where an exclusion zone was established and no personnel were present within that zone, two "ifs" apply: **if** the exclusion zone was in place and **if** no one was inside the exclusion zone. When both conditions are met, the event is not classified as a potential SIF because credible exposure to a fatal or life-changing injury did not exist.

Applies to the following energy sources:

- Electrical (e.g., energized conductors, arc flash potential)
- Gravitational (e.g., falls from ~4 feet or greater, objects dropped from elevation)
- Mechanical (e.g., rotating equipment, stored spring energy)
- Kinetic (e.g., vehicles, moving loads, struck-by hazards)
- Pressure (e.g., compressed gases or liquids in vessels, cylinders, tanks, or piping systems)
- Chemical or thermal (where energy transfer can meet or exceed the threshold)

Resource Links:

Energy Calculator

DROPS Calculator

3.1 Electrical Energy Examples

1. Potential: While performing maintenance activities, a technician attempted to connect a 480-volt industrial power plug to supply power to auxiliary equipment. Because the technician did not verify proper isolation or proper wiring before energizing the connection, an unintended back-feed condition occurred. This caused electrical current to flow in reverse through the system, resulting in an immediate electrical fault that damaged connected equipment, including control panels and associated components. Although no personnel made direct contact with the energized equipment, several crew members were working nearby when the incident occurred.
2. Potential: While troubleshooting a tripped mix pump breaker with the breaker locked out, a worker removed and dismantled the power cord for inspection. During the inspection, the loose bell housing contacted the prongs, causing an electrical

arc that resulted in eye irritation and welder's flash. The incident was attributed in part to a mislabeled receptacle.

3. Mitigated: While isolating a 480V breaker, the worker encountered a mechanically misaligned disconnect handle that prevented the breaker from fully opening. Because the breaker did not completely disengage, voltage remained present even though it appeared to be in the OFF position. After applying lockout and verifying zero energy with a digital multimeter, the worker detected the unexpected voltage, which prompted the worker to stop work immediately. This action prevented potential exposure to live electrical energy and allowed the issue to be identified and corrected before work continued.

3.2 Gravitational Energy Examples

1. Potential: While laying down drill pipe, a joint of pipe came out of the catwalk trough and fell to the base of the substructure. Barricaded areas were not in place to prevent personnel from entering the area.
2. Potential: While painting a stacked rig in the drilling yard, a gust of wind caught the painter's tarp secured to a crown stand, causing the crown stand to fall into the work area. The tarp had been secured to the crown stand and substructure to prevent overspray.
3. Mitigated: While laying down drill pipe, a joint of pipe came out of the catwalk trough and fell to the base of the substructure. As a result, the pipe landed in the barricaded area, preventing personnel from entering the area.
4. Mitigated: While the crew was in the process of walking the catwalk out of the way to prepare for the rig walk, the davit arm for the climb assist in the crown was broken at the welds. The safety cables for the davit arm prevented the post from dropping.

3.3 Mechanical Energy Examples

1. Potential: While running casing with a CRT, the elevator arms inadvertently were floated in allowing the elevator to strike the handling plug and open unexpectedly. The upper end (box) of the casing fell from a height of 25 feet above the rig floor where the rig crew and third-party were still present.

2. Potential: While making a connection, the Driller applied torque to screw the top drive into the drill pipe and unlatched the jaws as the pipe-handling arm was being lowered. During this sequence, a mechanical failure occurred, releasing stored mechanical energy and producing a loud bang as a section of the floor hydraulic pump drive shaft detached. The detached section, weighing approximately 20 pounds, was ejected and came to rest at ground level about 82 feet from the well center. No injuries occurred.

3. Mitigated: While rough drilling surface, the crew made a connection, barricaded the rig floor, and gathered in the doghouse. While drilling down the stand, the bolts on the stabbing guide sheared allowing the stabbing guide to come free with the secondary retention preventing a drop to the rig floor.

3.4 Kinetic Energy Examples

1. Potential: While skidding the rig, the loader operator was positioning matting for the next well when, during backing maneuvers, the loader contacted an upright cement container. The contact caused part of the container skid to slide off the matting, releasing potential energy and resulting in the container becoming unstable and tipping to the ground.

2. Mitigated: During lifting operations, a suspended load began swinging, creating a potential struck-by hazard. The exclusion zone and spotter prevented personnel from entering the hazard area.

3. Mitigated: While backing up to unload the driller's side substructure in the drilling yard, the ground gave way under the tandem truck. This caused the truck and trailer to tip over. The exclusion zone was maintained, and there were no injuries; the driver was wearing his seat belt.

3.5 Pressure Energy Examples

1. Potential: As the driller began washing down, the pumps were started with the pressure limiter set at 2,000 psi and the mud pump at 78 strokes per minute. Because pressure simultaneously released from the rotating head, the bushings

were pushed out of the hole due to the orbit valve having been left closed following MPD system testing. As a result, the unexpected pressure release displaced the bushings, though no injuries occurred; the closest person was approximately 6 feet from the rotary table behind a stand of pipe in the mousehole.

2. Mitigated: While drilling ahead in the lateral, a kicker hose located between the 1st and 2nd suitcases failed at the crimp, resulting in a high-pressure release to the matting and drill pad. No workers were injured due to high-pressure danger zones being maintained around the suitcases.

3.6 Chemical or Thermal Energy Examples

1. Potential: While preparing to mix caustic, the worker filled the caustic barrel with hot water and added an entire bag of caustic, which triggered an immediate exothermic reaction. The rapid release of chemical energy caused the solution to boil over and contact the worker, resulting in first-degree chemical burns to his hands and his arms.

2. Mitigated: While drilling the lateral section using produced water, the crew was offloading produced water into a holding tank located beside the doghouse/water tank building. During this task, the H_2S monitoring system alarmed, prompting the rig crew to initiate the emergency response plan, don SCBAs, and muster at the designated location. The Driller and Derrickhand, wearing SCBAs, investigated and determined that the H_2S sensor located on top of the holding tank near the hatch had activated. Measurements at the tank hatch indicated an H_2S concentration of 115 ppm.