

Developing a Risk Based Recommended Practice for Fire Resistive Clothing

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Introduction

Why develop a risk based recommended practice for fire resistive clothing? Doesn't everyone in industry where flash fire hazard potential exist already wear fire resistive clothing? (NFPA 2112). Doesn't OSHA require fire resistive clothing? (OSHA 1999). Doesn't this effort seem a bit unnecessary? If you answered yes to most of these questions, please read on.

This paper and the associated session remarks are intended to take the reader or participant on a journey into hazard awareness, likelihood of event happening, risk determination and practical applications. My experience comes from over thirty years in the oil and gas industry and a desire to solve issues. While I am presenting his paper and the associated remarks, colleagues from industry and regulatory agencies are the reason this effort will succeed. It is their willingness to explore what can be done and assure the final product is value added and meets its intended result to have a risk based recommended practice for fire resistive clothing that may ultimately save someone from serious injury or death.

This paper and presentation will start with why the need for a recommended practice became a goal. I will speak to concepts of hazard assessment, hazard awareness, hazard identification and other forms of hazard. I will talk subjectively about potential, probability, or likelihood of event occurrence. Risk assessment or risk will be discussed to assure the reader is clear that risk is not the same as hazard or likelihood; rather, it is a product of the two.

We will then move onto how the Standard has been developed. This will be a story of commitment, argument, and resolution, something all good teams go through.

While the Standard is still in final development stages and as such cannot be quoted, I encourage the reader to obtain a copy of the Standard when it becomes available, read and hopefully make full use of it.

A short disclaimer here, my remarks are my own and do not represent any one group or entity. While I will try to be factual in every detail, I know I will miss points; hence opportunities to ask questions at the presentation. Also, this Standard and the efforts behind it are intended to reduce the risk of serious injury or fatal injury. However, flash fire his hard to quantify, though I think we did a good job with it, and as such I would never suggest fire resistive clothing be the

first line of protection where the hazard of explosion, sustained fire or flash fire could exist. Simply, personal protective equipment, of which I consider fire resistive clothing to be, should be worn and hence used as a final safe guard and mitigation when engineering controls, procedures and design changes have not eliminated or mitigated the risk.

Need for Standard

It may seem unnecessary to develop a Standard for determining when to require fire resistive clothing. Many would and have argued that between Companies already having policies in place or OSHA having guidance, a Standard would be unnecessary. There are many who would disagree and suggest it is because policies and guidance have been developed without complete understanding of the hazards, likelihood of event occurrence and the overarching understanding of the risk that a Standard is needed.

In developing a Standard the work group has to address many aspects and elements of the subject and resolve many issues that may seem trivial but require the work group to consider regardless. This the work group has done. In developing the Standard, the focus has been specific to Upstream Oil and Gas Operations that include well drilling operations, well completion operations, production operations, well servicing operations and construction activities ancillary to the production of oil and gas. Each of these activities has unique aspects that had to be considered when developing the Standard. This was done.

Regulations, industry practices, and guidance documents were reviewed and considered as well. While there were two overarching considerations, it was these two considerations that ultimately support the development of a Standard - Regulatory Guidance and Industry Practice. We would all like to believe that both are always clear, consistent and sustainable. They are not. Simply this is not the case because guidance and practices are developed with a subset of the expertise that is generally present when a Standard is developed. I do not suggest that every guidance or practice needs exhaustive engagement of a large group of people to put forth the information, that is the purpose of a Standard. Likewise, a Standard, by process, needs to be based on available scientific information, history, economics, legal standard, and knowledge base of a group that can assess how perceived conflict between the information can be resolved.

So with the case made for a Standard, let's look at the various aspects of the Standard and how regulatory guidance, industry practice and others considerations led to the Standard.

Hazard

Notice the subheading, Hazard. I made it a noun on purpose. Hazard can be defined as both a noun and a verb. By definition, at least the one used for the basis of this discussion is a hazard is "exposure or vulnerability to injury, loss, evil, etc." (TFD 2013a). Further, exposure presupposes that the hazard is present, while vulnerability presupposes that the hazard could be judged by reasonable individuals to potentially be present, but is not present at the moment. It is the difference between exposure and vulnerability that is important to recognize in this discussion.

Likelihood

Likelihood is also a noun defined as “the state of being probable; probability.” (2013b). In practical application probability of an occurrence is determined either through analysis of historical events or professional judgment. As an example, history tells us that in the northern hemisphere, I should plan to wear a coat in January as history tells us it will be colder than in July. However, judgment has to be exercised if I plan a trip in January and contemplate a trip to the northern tropics. Should I take a coat? The point is that probability is ultimately a judgment call that includes various factors. The simplest factors however are to look at history of occurrence and process the data through experienced professionals who can make judgment calls required. Especially when history shows very few occurrences of the vulnerability of the event occurring, even though the elements of the hazard are present regularly.

Risk

In its simplest term, risk is the product of the hazard and the likelihood. It is this concept used in developing the Standard. It is also this definition that sparked discussion that had to be resolved with respect to guidance and practice. Simply, do you consider hazard as exposure to or vulnerability of exposure to? Then depending on the consideration used, what process do you use to determine the likelihood? Keep in mind the vulnerability means the potential exists but the exposure has not occurred. Can you set a Standard and put forth an expectation that behaviors will have to be modified and costs incurred on a potential?

Key Aspects of the Standard Development

Working Together

Developing a Standard that is consistent and sustainable requires a broad based group of individuals who can process information, resolve disagreements and drive to a consensus that has the desired result.

To develop this Standard representatives from industry and regulators came together to build the justification and develop the technical aspects of the Standard.

In doing so, both groups gained a perspective of what the drivers were for developing the Standard. The most important being worker safety.

Process

The American Petroleum Institute (API) Procedures for Standards Development (Procedures) provide specific guidance for API standards activities including; project justification and initiation of new standards; approval balloting; requirements for balance, consensus and due process; procedures for revision, reaffirmation and withdrawal; criteria for processing requests for interpretations; intellectual property and patent policy guidance; and API's appeals process. (API 2011).

The work group followed this process in creating the Standard.

Key Aspects Considered in the Standard

Scope

Without a tight scope, the remainder of the Standard could be inconsistent and non-sustainable. Thus the work group spent considerable time and effort to define the scope. In defining the scope, the focus is on upstream oil and gas operations. Discussion involved including oil and gas operations covered by Process Safety Management and decided that was out of scope for many obvious reasons.

Other Standards were reviewed and considered in making the determination of scope. (NFPA 2012a). Other Standards including API and NFPA documents along with international standards and practices.

There was discussion around including in scope determinations about various aspects of FRC clothing; but, it was determined in developing a risk based approach for determining need, aspects of limitations, care and maintenance of clothing was out of scope. These are best left to Standards such as NFPA 2113 which defines performance of FRC clothing. (NFPA 2012b).

Definition

Flash Fire

It may seem trivial effort to define a flash fire. Most people recognize a flash fire and intuitively the definition. However, to be able to adequately prepare a consistent, sustainable Standard a definition has to be developed.

To define Flash Fire, the work group considered duration, overpressure development, and other aspects. The definition did not include aspects of fire that could be sustained or was initiated as a result of a deflagration or explosion that would by definition result in an overpressure condition that could cause, or potentially cause injury by itself.

FRC

Defining FRC was problematic. There are various understandings of the acronym FRC. They include flame resistant clothing, fire resistive clothing, and other variations. What was important in considering the definition ultimately is that between the definition of Flash Fire and FRC, was the desire to develop a Standard that provided a risk based approach to determining when FRC is appropriate as a piece of personal protective equipment.

Tools

To provide the user with practical information, we considered a number of hazard and risk assessment tools to include. We also considered information ancillary to the Standard, such as consideration for various climatic conditions, or how this personal protective would interact with other equipment serving specific needs, for example chemical hazards.

Appendices

The early drafts of the Standard included information as part of the base Standard that on review was better suited for inclusion in Appendices. For example, references such as API 500 and examples incorporating other tools were moved to Appendices. The rationale was to keep the

Standard focused on risk concepts and not clutter the issue with information that is needed to apply risk techniques, but does not change the risk discussion.

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