Hydrology
2022; 10(1): 12-20
http://www.sciencepublishinggroup.com/j/hyd
doi: 10.11648/j.hyd.20221001.12
ISSN: 2330-7609 (Print); ISSN: 2330-7617 (Online)

A Review in Enhancing Hydrological Safety by Implementing Risk Management Strategies

Sothivanan Shanmugam[1, *], Manikandan Kanagasabai[1], Elamparuthi Devanathan[2]

[1]Department of Chemical Engineering, Annamalai University, Chidambaram, India

[2]Department of Business Administration, Annamalai University, Chidambaram, India

Email address:
ssothihse@gmail.com (S. Shanmugam)
[*]Corresponding author

To cite this article:
Sothivanan Shanmugam, Manikandan Kanagasabai, Elamparuthi Devanathan. A Review in Enhancing Hydrological Safety by Implementing Risk Management Strategies. *Hydrology.* Vol. 10, No. 1, 2022, pp. 12-20. doi: 10.11648/j.hyd.20221001.12

Received: December 26, 2021; **Accepted**: January 19, 2022; **Published**: January 26, 2022

Abstract: This manuscript analyses the risk management in the oil and gas industries. The manuscript discusses risk management in the consideration of large uncertainties in addition the utilization of adaptive risk management in various conditions. This type of management depends on the certainty that a better choice cannot be made, on the contrary, a few choices must be powerfully followed in order to obtain data and information on the implications of different strategies. Henceforth, the safety in addition risk of management in gas and oil efforts is a basic need. The risk management strategies should be analyzed to avoid the risks happen in the oil and gas industries. Mostly, risks are happened in the oil and gas industries with the human error, natural accidents. In the manuscript, we focus on a case from the oil and gas sector, the primary thing is to gain experience on how the management can carry out risk management while focusing on major hazard information and vulnerability areas. Of late, a few authors have competed to obtain some new types of risk perspectives, including information on how vulnerabilities and dangers are perceived, and the assessment that this article uses these perspectives as a reason for conversation.

Keywords: Risk Management, Oil Industry, Gas Industry, Risk-Based Inspection, Dynamic Risk Assessment

1. Introduction

One of the contemporary difficulties faced by risk evaluators and directors is the structures and exercises described by the deep impact. Samples include exploring and overseeing complex monetary subsidiaries, innovations, arrangements for climate change, emerging diseases, and a complex and exceptionally woven foundation. Vulnerability respects future circumstances and consequences, and causes barriers to information. A fundamental feature caused by these restrictions on information, due to the deep impact, is the lack of reasonable expectation models.

Focusing on monetary issues and applying the techniques of executives is one of the key prerequisites for various companies, for example, the oil and gas industry. Massive oil and gas projects are uniquely situated by exceptional issues, evaluating and segregating monetary issues, exploring mandatory components in risk mitigation and enhancing implementation value.

Risk management is a procedure which intentions to decrease the detrimental effects of an activity with the consideration exploit to reduce the undesirable events in addition plan to evade them. Risk management can be thought a procedure of evaluating or measuring risk in addition then designing methods for risk management. Overall, the methods are utilized to transferring risk to different sectors, all of the consequences of a specific risk, accepting a part, minimizing the negative effects of risk and avoiding risk [1].

Experts in the oil and gas sector will provide logical and specialized arrangements for the participation and integration of work, to look into issues and ensure the country's vast public resources. Risk management is a recent essential topic in management science which utilized in different applications to explore the different advantages such as modern and structural design initiatives, military, social, political, medical services, security, exchange, speculation and money [2]. Beyond that, the human death is a big issue to consider risk management in oil and gas industry.

Risk is a dubious but measurable case. The outcome of this case may be positive or negative. Vulnerability is considered by many individuals to be equivalent to chance, but in reality, it is not. Risk is the state of a situation that can be determined, but vulnerability does not have this potential and cannot be assessed. In fact, risk is a set of cycles that are needed to identify, explore, and react to risk in order to amplify the consequences of positive cases and limit the outcomes of unfavorable cases. One of the key variables at risk management is differentiating project-related risks with a fracture configuration approach [3].

The risk should be equal to the situation, project type and official construction of the fracture design association. As research has shown, the primary source of litigation and debate in the planning and development contracts of the upstream oil and gas industry is the lack of unique evidence and venture risk managers. In this way, it is only natural that countless lawsuits and disputes in the business should be avoided, with executives at risk of being distinguished by jurisdictions.

Risk management studies on risk regulation and differential demonstration should be done in a less complex, more stressful and reliable manner. To date, many attempts have been made by experts to extract large-scale operations [4].

It is important to look at the well-being, safety, risk of the organization and natural guarantee with the progress of businesses. Appropriate safe jobs, clear responsibilities, proper participation, safe products and managements will lead to quality work and more profitable outcomes. Structure-related elements can be used as a means of identifying risk and risk in demonstrating and differentiating risk and underlying conditions for risk management classes [5].

Process safety research can be divided into different sections such as security risk assessment, seismic vulnerability, corrosion risk assessment and accident risk assessment. Beyond that, the non-technical safety issues are considered such as safety culture and human error. Health, safety and environment can cause structural injuries, unfriendly wellness impacts and adverse effects on the climate at the operational level. It can enhance the usefulness of expertise and improve worker well-being (both physical and mental) and job completion. Furthermore, well-being, safety and climate are fundamental to the operational risk of executives from the hydrocarbon business. Although wellness, safety and climate are considered essential parts of business, there have been a few real accidents in the long run. A Deepwater hurricane crashes in the Gulf of Mexico, killing 11 people. The Piper Alpha Oil Rig accident, in which 167 people were killed, was brought about by poor communication at the shift handover and was exacerbated by power outages in the wake of the 13 crises [6]. Hit the Ekofisk Bravo platform in the North Sea. And an accident at the Onagawa Thermal Power Station [7].

1.1. Overview Gas and Oil Processes

Generally, the oil and gas processes are separated into two major activities such as downstream in addition upstream. The highly risky operation in addition most critical operations are centered at the upstream activities.

Upstream activities

Upstream activities are processes which occurred before refining of hydrocarbon and processing. These activities are production, conceptual development in addition exploration.

The upstream exploration and productioncomplicated the highest investment aimed atnovel product development because of exploration to determine reservoirs, operation, production in addition completion.

Downstream activities

Downstream activities involve processes after oil were transported in addition extracted towards crude oil terminals. Many activities are connecting to retail transactions, logistic, petrochemical plants, refining of the crude and processing. The downstream activities require storage devices, pipelines and industrial plants [8].

1.1.1. Upstream Activities in Oil and Gas Industry

Exploration: Interpreting and analyzing seismic information to compute the possible of hydrocarbon assets and drilling of test wells.

Conceptual Development: Processing screening revisions towards compute the cost effective and most efficient technique to generate potential hydrocarbon sources. This will contain chosen of conveniences (moored structures or floating), safety aspects of the operation, corrosion mitigation techniques and transport of hydrocarbon from field to customer (offloading vessels, floating storage and pipeline).

Development: project management of construction, commissioning of facilities, transport of facilities to location, optimum well location and detailed engineering.

Production: Meet new production targets, retrofit work to maintain new production targets, analysis of supply and demand, planning budgets and maintenance methods.

1.1.2. Downstream Activities in Oil and Gas Industry

Refining (transmission and gas processing)
Gas distribution
Retail
Petrochemicals

1.2. Risks

Risk is classified as an issue that can cause misfortunes or undermine the achievement of an endeavor. Usually in a task, "risk" is a potential problem that reduces the cost, schedule or specific achievements, which affects the nature of the goods and the resolution of the delegates. Risk can be divided into 'equity' and 'vulnerability', thus assessing whether it involves a monetary gain or misfortune in relation to the 'equity', and the vulnerability depends deeply on the time and circumstances [9].

Risk Management

Risk management can be classified as an essential business process in which managers need to evaluate whether business activities is consistent with its revealed core goals and how the risk management is integrated with investment and growth decisions.

Risk management is essential task for maintain the industry requirements such as maintaining reliability, optimal consistent operations without deviations and failures. Most risk management studies focus on avoiding most risks, disappointments, and understanding the causes of disappointments and the motives behind disappointments. The risk management takes into account the reliability of the venture structure due to the systematic strategy or mechanism for recognizing any important action, and added value by taking into account elite execution, effective cost management and compliance with project time constraints [10].

2. Systematic Analysis

In this section, systematic research is utilized to break down the dispersal of long-collected collections by journals in addition sectionsand cooperation among authors and organizations. The global allocation of distribution yields is an important indicator, as shown in Figure 1, to reproduce the importance, popularity, and progressive form of the logical analysis problem.

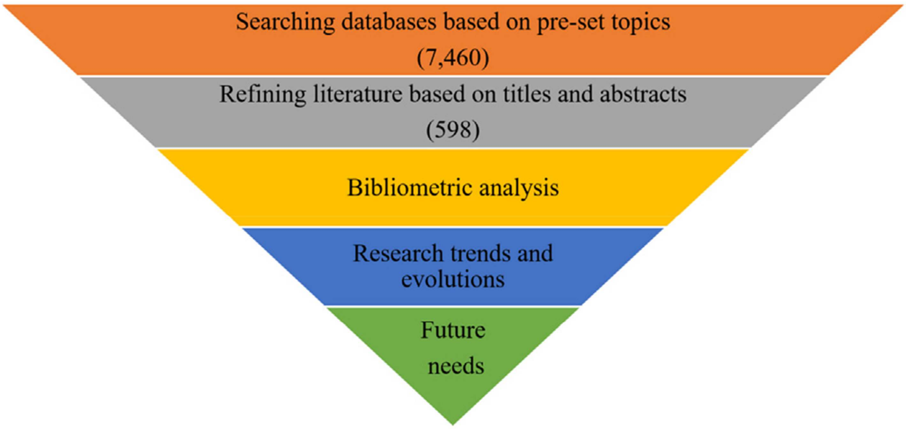


Figure 1. *Systematic literature review of security and safety of oil and gas pipelines.*

The total number of deliveries from 1970 to 2000 was 24, and in September 2019 it was 598. Following the catastrophic pipe burst and fire in Ghislenghien, Belgium, the volume of supplies expanded rapidly after 2004.

Environmental management and oil purification improvements can cause major accidents (fires, explosions, harmful holes) losses in gas and oil, harm towards the energy storage network and harm to the environment, affecting people in the environment. And different animals due to contamination of seawater, groundwater, surface water, desert and soil. Rendering to the examination method investigation, there has been a broad focus on the risk assessment of significant accidents in pipelines, while slighteffort has been done to quantify in addition minimize the natural penalties of significant accidents [11]. Natural hazard quantitative and assessment ecological implications must be combined into pipeline well-being. Furthermore, improvements should be made to the cleaning of the oil slick to mitigate the effects of significant accidents on the climate and biological system. Furthermore, experiments that detect carbon dioxide reduction should also be improved [12].

3. Risk-Based Inspection in the Oil and Gas Sector

Risk-based inspection (RBI) is used based on oil and gas and chemical companies. This system, with risk-based maintenance, was depicted by API RP 581 [13], which was initially developed for use in the refining business.

Standard support refers to the relationship between exercises and topics within businesses. RBI also applied and adapted in different inspection activities and other sectors, which allowing got the detection of failure methods and rates related on equipment status.

The RBI focuses on adhering to the mechanical integrity of pressure equipment items and restricts the risk of losing control due to corrosion, and is an alternative to PHA (Process Hazard Analysis) or hazard and operability assessment (HAZOP). The RBI is mutually exclusive in addition to the RCM (Reliability Centered Maintenance) schemes because both understand fraudulent methods and use methods, and therefore focus on the reliability of equipmentand process facilities. The guidelines, for example, API 581, DNV G-101 and EN 16991: 2018, developed the theory of on-stream selection, which stimulated the advancement of benefits such as stabilization and prioritization of trial and support exercises, significant cost reserve funding and additions. Reducing operational risk, refreshing and long-term risk management while providing informational basis for past reviews and future assessment planning [14].

In accordance with those regulations, the Petroleum Safety Authority (PSA) [15] is constantly updating the guidelines for inland and coastal offices, proposing the use of a risky approach in dealing with security structures and capabilities, affirming the importance of the RBI principle. Processing the hardware as well as moving the perspective to well-being prevents the board.

Risk-Based Inspection Planning

DNV-GL provides a tool for RBI organization named Synergi Plant RBI. A fundamental aspect of production is the plant honesty of managers, and it aims to provide an itemized plan for an alternative approach to quantitative risk monitoring at upstream and downstream communication plants and at sea level. The Synergy plant adheres to RBI-specified business guidelines and recommends rehearsals for the RBI. The product is planned using the meaning of risk provided by API 581.

$$R(t) = PoF(t).CoF \quad (1)$$

Where, PoF can be described as probability of failures in the operation of time (t) which multiplied with the consideration of the failures which terms of consequence area, R can be described as risk.

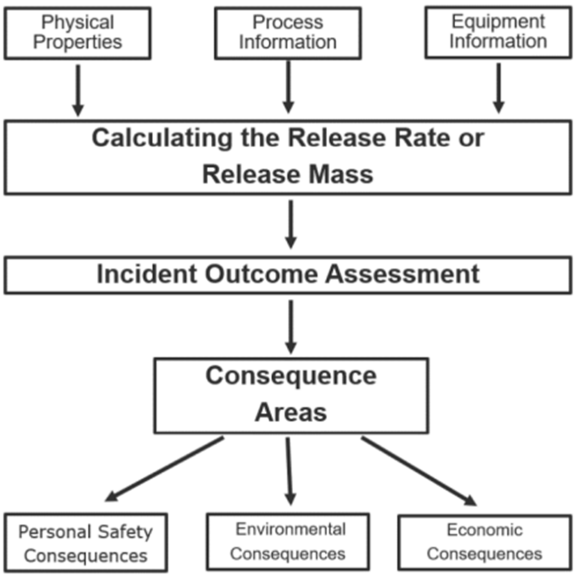


Figure 2. *The Consequence of Failure (CoF) calculations based on API 581.*

The probability of failure $PoF(t)$ is computed as the product of a damage factor $d_F(t)$ and generic failure frequency GFF, in function of time (t), and a management systemsfactor F_{ms},

$$PoF(t) = GFF.d_F(t).F_{ms} \quad (2)$$

Typical generic failure frequencies are classified as disappointments each year and are regulated in API 581, as part of a scalable investigation of long-term information about disappointments in hardware, area type and light opening size (small, medium, massive, explosion) based on its working condition, material and fluid properties and wall thickness. The management factor affects all plant equipmentequally and does not change the demand for investigation, while management structures may pose an obvious risk to the possibility of being less than ideal [16].

Synergy plant RBI, taking into account the selection target estimate at the creation unit level, in the light of production cost data, for example, the cost of equipment per unit area, the thickness of the population, the cost of injury per individual, the cost of blackouts per day and the number of deaths. The product proposes evaluation programs based on the risk study of the development of harmful equipment of plant equipment. Includes a solution sheet containing product results, input information, dynamic harm systems, review history, and a proposed trial plan for each hardware [17].

4. Risk-Based Process Safety

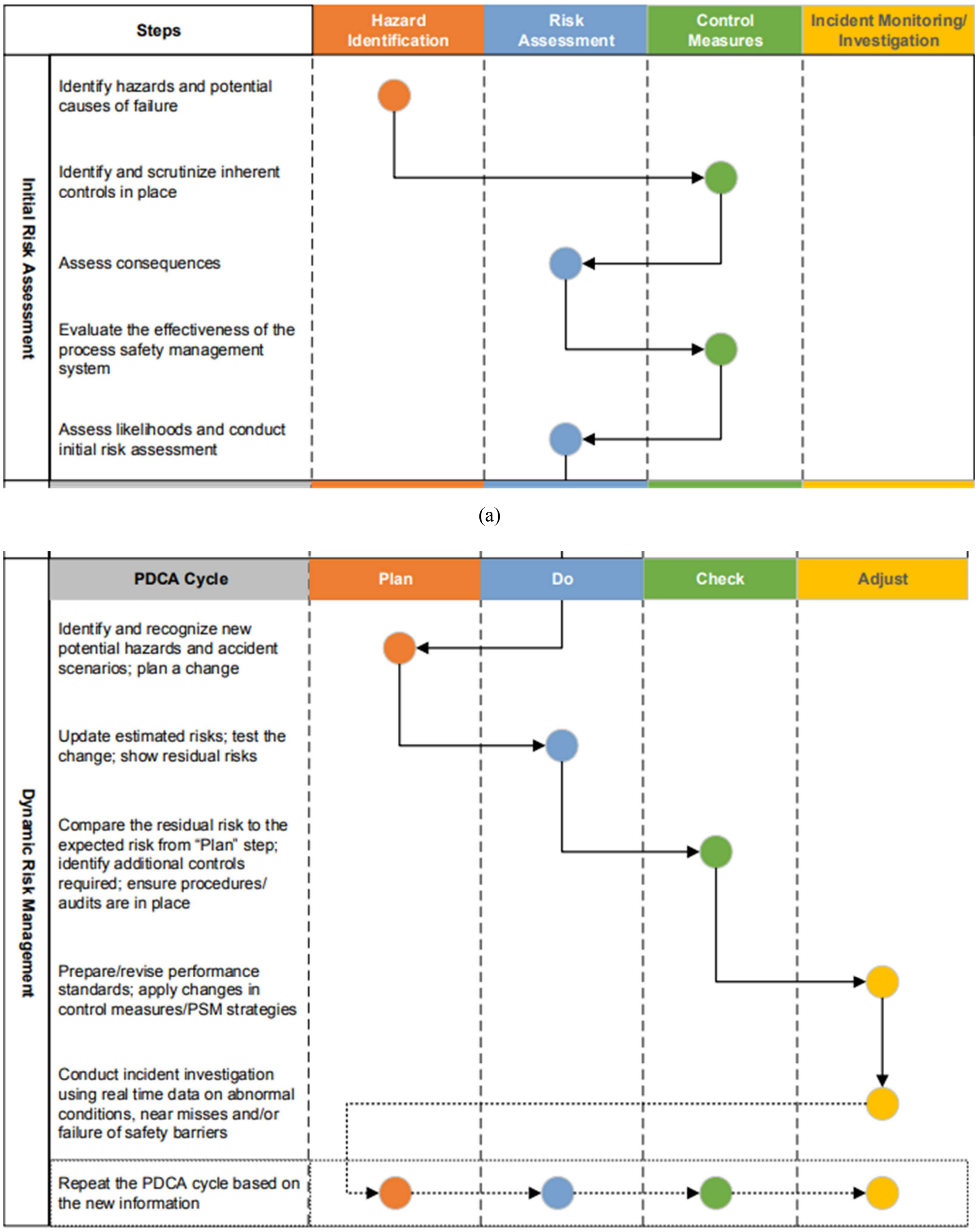
While the management systems across the planet are routinely ordered to enforce the mutual protection of executives, the episode selections distinguish the implementation of an administrative structure that is not the main sponsor of events. An incident such as the tragic Deepwater Horizon bombing in addition oil slick in the Gulf of Mexico in 2010 has elevated issues around the probability of a recurrence. There is an overall need to show which risks can besufficientlymeasured for material in addition significant risk areas because businesses and regulators are constantly judging the use of significant event to gain public attention. In these ways, it is fundamental to improve the routine cyclical well-being of board approaches to stay away from the exploitation of organizations 'communication protection process. To accomplish the greatness of the process well-being requires identifiable evidence of abnormal cycle conditions and the implementation of restorative measures before the actual event occurs. Based on studies of the effects of recurrence and potential accidents, a relevant tool for evaluating the well-being of a group program activity is risk investigation [18].

"The risk-based approach minimizes the likelihood of appointing a large amount of assets to oversee low-risk cases, and accordingly opens assets for faults facing higher risk cases." Using risk-based process safety (RBPS), it is possible to differentiate the shortcomings of the PSM structure and create the assets needed to further enhance the security of the board rehearsal process. In the United States, the CCPS's archive of RBPS rules is a key risk - based PSM program that considered the whole risk in the industries, and that more assets should be more risk - centered. Although Chemical Process Safety (CCPS) has become a risk-related method, CSCHE is the first CCPS framework for use in Canada, supported by guidance given in the United States. In Europe, moreover, a risk-related perspective has long been tried in a few countries, and distributions like Dutch "Purple Book" given rules, normal guidelines, in addition information towards aid different practices.

In the European system, RBPS is used towards reduce, regulator and reduce hazards in solitary offices, and has been arranged for land utilizationabout artificial spaces to mitigate the risk of massive compound clusters and populations [19, 20]. A few risk assessment strategies have recently been developed by various companies and management organizations.

Dynamic Risk Assessment

Any relationship depends on weakening over time for natural and exclusive reasons. A dynamic risk assessment (DRA) is classified as a strategy in this work that enhances the assessed risk of vulnerable interactions as demonstrated by the control structure, wellness barriers, investigation and support exercises, human components and methods. The policy distinction between conventional risk assessment strategies in addition the DRA method may be illustrated utilizing Figure 3, thatpresents a flow diagram of a common DRA strategy. Practically complete subjective and measurable risk testing strategies represent the initial three stages approved in Figure 3, which include risk differentiation evidence, risk assessment, in addition assessment of control computations. Nevertheless, a DRA strategy to reconsider the assessed risk involves additional time to verify and diagnose abnormal conditions [21].



(a)

(b)

Figure 3. *Typical analysis of management flowchart (a) initial risk management and (b) dynamic risk management.*

There have been some pledges recently in proposing and advancing DRA techniques. Although each of the introduced approaches shares the four basic conditions recognized in Figure 3, a far-sighted audit of these confirmations shows that they can be recognized depending on the three associated models:

Type of data used

Risk Rejuvenation Tool

Consequences of failure (COF) and Probability of failure (POF)

Table 1 has significant responsibilities in the powerful risk investigation of rotation offices in additioncontrasts them related on the above three models. Table 1 additionally describes the disadvantages and advantages of every strategy. From the consideration of Table 1, the Bayesian informing cycle and frustration descriptions in addition the tie method for integrating novel approved possible risks can be the two primary methods used in most DRA applications [23]. However, due to the inherent constraints on each of the techniques in Table 1, there is immobile some information and mechanical holes in the powerful risk assessment that can be explored in the following segment.

Table 1. *Risk barometer based dynamic risk analysis.*

Method	Reference	Description
Risk barometer	[24-29]	Data used: Deviation survey from optimal position of technical, functional and hierarchical markers Update System: Indicators are used to continuously monitor the implementation of well-being disruption, which takes into account continuous assessment of common risk types. Benefits: Special pointers are attached to effective functional / hierarchical markers to examine early deviations that trigger degrading safety barriers that trigger undesirable situations and increase basic risk. evils: It is case-transparent and to some extent depends on the primary judgment of the executives, depending on the direct models and the applicable markers, whose classification may be unpredictable. Such discrepancies may make one think twice about the greater risk assessment.

Table 2. *Loss functions-based risk analysis.*

Method	Reference	Description
Loss functions	[30-33]	Data utilized: Deviation of key cycle qualities from goal esteems. Updating component: Loss capacities can be utilized to relate process variations to monetary misfortunes. Benefits: Gives a component to constant misfortune demonstrating, Promotes nonstop improvement of cycle wellbeing through proactive misfortune minimization. Inconveniences: Choice of a legitimate misfortune capacity could be hard for information scant cycles.

Table 3. *Principal Component Analysis (PCA) based dynamic risk analysis.*

Method	Reference	Description
Principal component analysis (PCA)	[34-36]	Data used: Process history Updating tool: The probability of a problem can be determined by the PCA severity of the defect and split score can be the weighted normal of the effects of every factor on the score. Benefits: Utilizes the relationship between a variety of procedures, contact information, and results, extracting passive components from high-dimensional information. evils: Depends on straight models in addition expects Gaussian confusion, incapable to demonstrate compound conditions between factors, most applications require rotation model

Table 4. *Bow tie based dynamic risk analysis.*

Method	Reference	Description
Bow-tie	[37-42, 25]	Update System: Continuous security-related data recovery is integrated with routine bow tieanalysis to gradually assess risk. Benefits: Direct possible implementation evils: The ability to deal with vulnerability, multi-state factors and ward frustrations was curtailed by the use of direct Boolean skills in tie selection.

Table 5. *Bayesian based dynamic risk analysis.*

Method	Reference	Description
Bayesian	[43-49]	Data used: Process history, pre-accident information, warning data packages Refreshing Mechanism: The Bayesian updating component is utilized to renew previous politics about accidents through adding novel data from the framework. Benefits: Ability to deal with vulnerability, multi-level factors, complex causal links and subsequent downline frustrations. Evils: The high computational weight of generating contingency probability tables, the inability to demonstrate complex conditions between factors, and the use of definitive and additionally normally distributed probabilities.

After evaluating the DRA techniques in the table above, the innovative holes between the current strategies and the preconditions for a mandatory DRA strategy indicated by the definition given in the precedingunit are recognized as surveys:

There is no way towards deal with DRA which can apprise both COF in addition POF. With the exception of the unfortunate work approach, which can be used to reconsider the estimated practical loss of an omitted function, any remaining strategies may be measuredpowerful in computing the possibilities of possible cases. In many cases, it can be expected that an unchanging key contact brand can be pushed into a framework.

To disregarding the ambiguity related with the probability computations, the deterministic point-based probability parameters can be utilized in various submissions. In few new enlargements in the PCA-based algorithmsin addition Bayesian Network (BN), conventional rotation was used as the minimum conduction. There is no hesitation, however, which the supposition of collective regulation neglects towards provide relevant replicas in different applications.

Autonomous or straight downstream factors can bemeasured in completesubmissions in the table. At the end of the day, existing models generally ignore the complex inaccuracies in the factors that affect the risk of the structure.

5. Future Scope

The oil and gas industry recognize that the wells of danger are not many, in fact, that risk can be divided into controllable and uncontrollable risk or hard risk and mild risk. By grouping those risks or issues into groups, you can start with as many modest plans as possible to eliminate as many risks as you can expect. More broad assumptions, models and executives' techniques should be used or taken for oil and gas research because of its convoluted risk components and business nature. Therefore, greater commitment to the business can be developed in reducing people's risk attitudes, improving efficiency, expanding quality and reducing cost and time.

6. Summary

Attempts have been made to gradually diversify risk assessment techniques, taking into account the importance of current risk-based selection solutions. Having a powerful functional risk assessment tool provides continuous measurement to measure well-being and quality processing and screen processing. This paper examines the progress of risk-based mechanisms and policy commitments in the field of dynamic risk assessment, particularly in the gas and oil businesses. Contrary to the limitations in addition qualities of the unique powerful risk assessment strategies introduced, the current mechanical in addition team difficulties in managing the approach to efficient and potentially unique risk differentiation vary. The basic controls of approved current techniques are as follows: (i) thought about the unchanging vital properties of the hazardous structure; (ii) forgetfulness of complex reliability amongst risk variables; In addition (iii) the utilization of a definite feasibility value that adds to the impact of the computed risk. Possible ways to develop a complete in addition adaptable powerful risk assessment tool to deal with these difficulties have been explored.

References

[1] Terje Aven, "Risk assessment and risk management: Review of recent advances on their foundation." European Journal of Operational Research 253, no. 1 (2016): 1-13.

[2] Faisal Khan, Samith Rathnayaka, and Salim Ahmed. "Methods and models in process safety and risk management: Past, present and future." Process safety and environmental protection 98 (2015): 116-147.

[3] Mohammed Ismail Iqbal, Osama Isaac, Ibrahim Al Rajawy, Shamsuddin Khuthbuddin, and Ali Ameen. "Hazard identification and risk assessment with controls (Hirac) in oil industry–A proposed approach." Materials Today: Proceedings 44 (2021): 4898-4902.

[4] Chao Chen, Changjun Li, Genserik Reniers, and Fuqiang Yang. "Safety and security of oil and gas pipeline transportation: A systematic analysis of research trends and future needs using WoS." Journal of Cleaner Production 279 (2021): 123583.

[5] Mehul Vora, Steinar Sanni, and Roger Flage. "An environmental risk assessment framework for enhanced oil recovery solutions from offshore oil and gas industry." Environmental Impact Assessment Review 88 (2021): 106512.

[6] Torbjørn Bjerga, and TerjeA ven. "Adaptive risk management using new risk perspectives–an example from the oil and gas industry." Reliability Engineering & System Safety 134 (2015): 75-82.

[7] Andika Rachman, and RM Chandima Ratnayake. "Machine learning approach for risk-based inspection screening assessment." Reliability Engineering & System Safety 185 (2019): 518-532.

[8] Khairul AzizanSuda, Nazatul Shima Abdul Rani, Hamzah Abdul Rahman, and Wang Chen. "A review on risks and project risks management: oil and gas industry." International Journal of Scientific Engineering 6, no. 8 (2015): 938-943.

[9] Y. Javid, "A bi-objective mathematical model to determine risk-based inspection programs." Process Safety and Environmental Protection 146 (2021): 893-904.

[10] Behnaz Hosseinnia Davatgar, Nicola Paltrinieri, and Roberto Bubbico. "Safety barrier management: risk-based approach for the oil and gas sector." Journal of Marine Science and Engineering 9, no. 7 (2021): 722.

[11] Marta Bucelli, Ingrid Bouwer Utne, Pierluigi Salvo Rossi, and Nicola Paltrinieri. "A system engineering approach to subsea spill risk management." Safety Science 123 (2020): 104560.

[12] Kuok Ho Daniel Tang, "A Case Study of Asset Integrity and Process Safety Management of Major Oil and Gas Companies in Malaysia." Journal of Engineering Research and Reports (2021): 6-19.

[13] Erik Mygind du Plessis, and Bjarne Vandeskog. "Other stories of resilient safety management in the Norwegian offshore sector: Resilience engineering, bullshit and the de-politicization of danger." Scandinavian Journal of Management 36, no. 1 (2020): 101096.

[14] U. Idriss, and M. Z. Lawan. "Modelling of Safety Management System (SMS) Using Fire Systemic Safety Management System Model (FSSMS) for Bonga Offshore Oil and Gas Field, Nigeria." Savanna 3, no. 1: 21-27.

[15] Muhammad Ajmal, Ahmad Shahrul Nizam Bin Isha, Asrar Ahmed Sabir, and Shahrina Md Nordin. "Management Commitment to Safety and Safety Training: The Mediating Role of Safety Compliance for Occupational Accidents in Oil and Gas Industry of Malaysia." AJSS 5, no. 3 (2021): 266-278.

[16] Razali Bin Hassan, M. M. Asad, Q. M. Soomro, and F. Sherwani. "Severity of the casing and cementing operation with associated potential hazards in the drilling process in the on and offshore oil and gas industry: a cross-sectional investigation into safety management." Pertanika Journal of Social Science and Humanities 25 (2017): 129-138.

[17] Stephen C. Theophilus, Victor N. Esenowo, Andrew O. Arewa, Augustine O. Ifelebuegu, Ernest O. Nnadi, and Fredrick U. Mbanaso. "Human factors analysis and classification system for the oil and gas industry (HFACS-OGI)." Reliability Engineering & System Safety 167 (2017): 168-176.

[18] Xue Yang, Stein Haugen, and Nicola Paltrinieri. "Clarifying the concept of operational risk assessment in the oil and gas industry." Safety science 108 (2018): 259-268.

[19] Yuan Gao, Yunxiao Fan, Jing Wang, Xi Li, and Jingjing Pei. "The mediating role of safety management practices in process safety culture in the Chinese oil industry." Journal of Loss Prevention in the Process Industries 57 (2019): 223-230.

[20] Dana Mohammadnazar, and Amir Samimi. "Nessacities of Studying HSE Management Position and Role in Iran Oil Industry." Journal of chemical reviews 1, no. 4 (2019): 252-259.

[21] Øyvind Dahl, and Trond Kongsvik. "Safety climate and mindful safety practices in the oil and gas industry." Journal of safety research 64 (2018): 29-36.

[22] Donghong Tian, Chunlan Zhao, Bing Wang, and Meng Zhou. "A MEMCIF-IN method for safety risk assessment in oil and gas industry based on interval numbers and risk attitudes." Engineering Applications of Artificial Intelligence 85 (2019): 269-283. Baladeh, Aliakbar Eslami, Morteza Cheraghi, and Nim aKhakzad. "A multi-objective model to optimal selection of safety measures in oil and gas facilities." Process Safety and Environmental Protection 125 (2019): 71-82.

[23] Scarponi GE, Paltrinieri N, Khan F, Cozzani V. Reactive and Proactive approaches: tutorials and example. In: Paltrinieri N, Khan FI, editors. Dyn. Risk Anal. Chem. Pet. Ind., Oxford: Butterworth-Heinemann; 2016, p. 284.

[24] Sundaram Haridoss, "Health and Safety Hazards Management in Oil and Gas Industry." International Journal of Engineering Research & Technology (IJERT), 6 (6), 1058 1061 (2017).

[25] Villa V, Paltrinieri N, Khan F, Cozzani V. Towards dynamic risk analysis: A review of the risk assessment approach and its limitations in the chemical process industry. Saf Sci 2016; 89: 77–93. doi: 10.1016/j.ssci.2016.06.002.

[26] Paltrinieri N, Scarponi G. Addressing Dynamic Risk in the Petroleum Industry by Means of Innovative Analysis Solutions. Chem Eng Trans 2014; 36: 451–6. doi: 10.3303/CET1436076.

[27] Paltrinieri N, Hauge S, Dionisio M, Nelson WR. Towards a dynamic risk and barrier assessment in an IO context. Safety, Reliab. Risk Anal. Beyond Horiz. - Proc. Eur. Saf. Reliab. Conf. ESREL 2013, Amsterdam, Netherlands: 2014, p. 1915–23. doi: 10.1201/b15938-293.

[28] Paltrinieri N, Hauge S, Nelson WR. Dynamic barrier management: A case of sand erosion integrity. Saf. Reliab. Complex Eng. Syst. Proc. Eur. Saf. Reliab. Conf. ESREL 2015, Zurich, Switzerland: 2015, p. 523–31.

[29] Paltrinieri N, Hokstad P. Dynamic risk assessment: Development of a basic structure. Saf. Reliab. Methodol. Appl. - Proc. Eur. Saf. Reliab. Conf. ESREL 2014, Wroclaw, Poland: 2015, p. 1385– 92. doi: 10.1201/b17399-191.

[30] Hashemi SJ, Ahmed S, Khan F. Risk-based operational performance analysis using loss functions. Chem Eng Sci 2014; 116: 99–108. doi: 10.1016/j.ces.2014.04.042.

[31] Zadakbar O, Khan F, Imtiaz S. Dynamic Risk Assessment of a Nonlinear Non-Gaussian System Using a Particle Filter and Detailed Consequence Analysis. Can J Chem Eng2015; 93: 1201–11. doi: 10.1002/cjce.22212.

[32] Ali S. Mixture of the inverse Rayleigh distribution: Properties and estimation in a Bayesian framework. Appl Math Model 2015; 39: 515–30. doi: 10.1016/j.apm.2014.05.039.

[33] Pan J-N, Chen S-C. A loss-function based approach for evaluating reliability improvement of an engineering design. Expert Syst Appl 2013; 40: 5703–8. doi: 10.1016/j.eswa.2013.04.032.

[34] Jiang Q, Yan X. Nonlinear plant-wide process monitoring using MI-spectral clustering and Bayesian inference-based multiblock KPCA. J Process Control 2015; 32: 38–50. doi: 10.1016/j.jprocont.2015.04.014.

[35] Ge Z, Song Z. Distributed PCA model for plant-wide process monitoring. Ind Eng Chem Res 2013; 52: 1947–57. doi: 10.1021/ie301945s.

[36] Zadakbar O, Imtiaz S, Khan F. Dynamic Risk Assessment and Fault Detection Using Principal Component Analysis. Ind Eng Chem Res 2012; 52: 809–16. doi: 10.1021/ie202880w.

[37] Paltrinieri N, Tugnoli A, Buston J, Wardman M, Cozzani V. Dynamic Procedure for Atypical Scenarios Identification (DyPASI): A new systematic HAZID tool. J Loss Prev Process Ind 2013; 26: 683–95. doi: 10.1016/j.jlp.2013.01.006.

[38] Paltrinieri N, Khan F, Amyotte P, Cozzani V. Dynamic approach to risk management: Application to the Hoeganaes metal dust accidents. Process Saf Environ Prot2013; 92: 669–79. doi: 10.1016/j.psep.2013.11.008.

[39] Paltrinieri N, Tugnoli A, Buston J, Wardman M. Dy PASI Methodology: from Information Retrieval to Integration of HAZID Process. Chem Eng Trans 2013; 32: 433–8. doi: 10.3303/CET1332073.

[40] Pasman H, Rogers W. How can we use the information provided by process safety performance indicators? Possibilities and limitations. J Loss Prev Process Ind 2014; 30: 197–206. doi: 10.1016/j.jlp.2013.06.001.

[41] CCPS. Guidelines for Hazard Evaluation Procedures. New York: American Institute of Chemical Engineers (AIChE); 2008.

[42] Khakzad N, Khan F, Amyotte P. Dynamic risk analysis using bow-tie approach. Reliab Eng Syst Saf 2012; 104: 36–44. doi: 10.1016/j.ress.2012.04.003.

[43] CSChE. Process Safety Management Guide. 4th ed. Ottawa, ON: Canadian Society for Chemical Engineering; 2011. doi: 10.1201/b11069-30.

[44] Christou MD, Amendola A, Smeder M. The control of major accident hazards: The land-use planning issue. J Hazard Mater 1999; 65: 151–78. doi: 10.1016/S0304-3894(98)00261-1.

[45] API. Recommended Practice 581: Risk-Based Inspection Technology. 3rd ed. Washington: American Petroleum Institute; 2016.

[46] Cozzani V, Bandini R, Basta C, Christou MD. Application of land-use planning criteria for the control of major accident hazards: a case-study. J Hazard Mater 2006; 136: 170–80. doi: 10.1016/j.jhazmat.2005.12.031.

[47] Vinnem JE, Bye R, Gran BA, Kongsvik T, Nyheim OM, Okstad EH, et al. Risk modelling of maintenance work on major process equipment on offshore petroleum installations. J Loss Prev Process Ind 2012; 25: 274–92. doi: 10.1016/j.jlp.2011.11.001.

[48] Kalantarnia M, Khan F, Hawboldt K. Dynamic risk assessment using failure assessment and Bayesian theory. J Loss Prev Process Ind 2009; 22: 600–6. doi: 10.1016/j.jlp.2009.04.006.

[49] Khakzad N, Khan F, Amyotte P. Dynamic safety analysis of process systems by mapping bow-tie into Bayesian network. Process Saf Environ Prot2013; 91: 46–53.doi: 10.1016/j.psep.2012.01.005.