International Journal of Advanced Biotechnology and Research (IJBR)
ISSN 0976-2612, Online ISSN 2278–599X,
Vol-8, Issue-2, 2017, pp472-476
http://www.bipublication.com

Research Article

Retracted: Technical Inspection Engineering and Risk Based Inspection as index of efficient industrial management system

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ABSTRACT

Any organization looking for ways to reduce their costs, including operating costs, are maintenance inspection. Erosion and machine downtime can cost over time in addition to the risks and consequences too especially for personnel to be followed. To solve this problem over recent decades, new methods have been proposed, one of them is Risk Based Inspection (RBI). Fortunately, during the last few years Risk Based Inspection (RBI) has increasingly been used in the oil and gas industry, petrochemical and benefits that include reduced risks, lower costs and optimize resources has been demonstrated in practice. Unlike traditional methods that only focus on the likelihood of a risk. The consequences of a failure by using two indices are examined Probability Of Failure (POF) and the Consequences Of Failure (COF).So after determining the risk, basis risk and control solutions identified, controlled or reduced.In addition to the general introduction of this procedure and its advantages over traditional inspection methods, efficient and effective to do it is also discussed.

Keywords: inspection, risk, traditional methods, Risk Based Inspection (RBI), Probability Of Failure (POF), Consequences Of Failure (COF)

INTRODUCTION

Over the past decade the concept of Risk Based Inspection (RBI) is widely targeted for inspection in the oil and gas industry, petrochemical and nuclear industry has been used. Thus Risk Based Inspection (RBI) is an internationally recognized guideline for effective inspection programs [1]. In this way the risk levels of the classification rules so an inspection can be scheduled inspection resources on higher-risk cases put while in places with lower risk can prevent the waste of resources. In this way the two quantities can be used independently, probability and consequence of occurrence [2]. The product of these two quantities is the same amount of risk represents the risk of the system. This independent assessment of the likelihood and consequences of an accident leading to calculate the risk is that the system can be graded; this unique advantage is risk-based inspection and maintenance programs[3]. The consequence analysis and risk control strategies in the RBI can be obtained useful for pipes and equipment. The strategy RBI criteria of safety, environmental and occupational safety also meet the company. Any organization is looking for ways to reduce production costs (including operating costs overhauled). Chemical industry and refineries in the past with one of their biggest challenges faced and is still faced with tough market conditions and fierce competition has led to reduced profits; so here it is clear the importance of maintaining uninterrupted production flow. Another problem is the erosion of industrial infrastructure over time makes it ideal cannot fully access to all equipment [4]. To

solve these challenges, leading technologies have emerged over the past 10-15 years; Such as Risk Based Inspection (RBI), Fitness For Service (FFS), Reliability centered-maintenance. New technology companies will enable RBI to set a key factor in their decisions not involved; among the factors that determine the reliability of the equipment, environmental safety and occupational safety factors. The ability to analyze multiple factors simultaneously will allow users to better focus on their limited resources.

As a result, the likelihood and consequences of accidents RBI by a factor of key decisions "Installation, Maintenance and Replace" greatly improves [5]. In fact, the RBI reduces inspection time during the breakdown of the equipment because inspection programs on cases that are likely to occur while the interval time between failures inspections can often safely be increased and this makes access to equipment. By calculating the number mode crash risk can be graded from high-risk to low-risk. Then by this list it can prioritize maintenance program that can be controlled failures or delays.

METHODOLOGY

Risk Based Inspection for making an application to have acted this way:

1. Equipment list
2. Review process, a comprehensive review of primary and defined pressure systems
3. Determination of the consequences of failure
4. Determine the probability of failure
5. Determining the degree of criticality of inspection
6. The definition of a systematic inspection program (timeslots and objective method)
7. The comprehensive review

The details of each part are coming as follow;

1. Create and maintain a list of equipment:

In order to make the equipment list, the data is collected and sorted. Equipment list a file containing details of the design and operation of all the equipment is under pressure. The file must be maintained properly during the service life of the criticality of operations and strategy ranking calculations inspection [6].List of industrial equipment by location or type of system or type of equipment to be adjusted:

1. Fixed equipment including tanks, pressure vessels and heat exchangers
2. Pipes
3. Confidence valves
4. Rotating Equipment
5. Control valve

2. Initial comprehensive review and revision process defined pressure systems:

Before raw data into a computer model to a comprehensive review of the list of equipment and the list of processes and operating conditions of each unit is performed by operational personnel. Define and identify pressure systems are also part of this step.

3. Determine the consequences of failure:

The result of the calculation and grading done based on eight criteria:

-Commercial impact: Standby, Financial conditions

-Safety impact: Location impacts, Fluid risks, Available Fluid, Pressure, Population

-Environmental impact: Environment

4. Determine the probability of failure: The highest probability is the probability of failure models and Mechanisms appropriate by the relevant law and according to the type of equipment to be calculated. The possibility of a state of failure is detected when choosing a suitable method can be used to inspect and inspect each unit contains it.

5. Determining the degree of criticality of inspection: All units have a degree of criticality to be inspected and assigned an examiner. According to the degrees obtained a certificate in the certification of a defined timeframe the inspector confirms that unit under the same operating conditions during this period will continue to operate safely [7]. Last inspection as well as approved by the inspector determines the next inspection date.

Table 1: get the critically operation

		The consequence of failure	
Probability of failure	High	Average	Low
High	1	2	3
Average	2	3	4
Low	3	4	5

The allocation of fixed equipment inspection and pipes:

Degrees for inspection prior to the allocation of inspection data (including everyday conditions, data) are reviewed [8]. Cases have been reported according to the terms of a comprehensive inspection and are graded from 0 to 3.Levels of inspection speed indicator failure and machine downtime is predictable [9].

Grade: 0

In cases where:

A) Do not have any history to predict service performance. (Includes new)

B) The failure rate is high or c) quickly broke with previous data cannot be predicted.

Grade: 1

In cases where:

A) Be inspected at least once a grade 0

B) The average speed is failure.

Grade: 2

In cases where:

A) Be inspected at least once a grade 0

B) It quickly broke down.

Grade: 3

In cases where:

A) At least one zero and is inspected once with grade 1 to 2

B) Quickly broke down and has enough remaining life (Design remaining life can be predicted according to past data)

C) Assuming a stable environment where minimal downtime is speed.

The half-life for Grade 3 must be incorporated in a comprehensive review as to ensure that during this time, has not changed is not operating conditions and maintenance procedures or during the term forecasts do not work in reverse.

RESULTS

The definition and development of inspection:

Critical temperature and degree of inspection to determine the original inspection intervals used. The purpose of the inspection and the possible consequences of failure to achieve predicted failure mechanism failure identify and select the best method) is used for inspection and NDT (non-destructive testing.

A) Determining the inspection time intervals (pipelines and fixed equipment):

The degree of criticality of operations and the degree of inspection to determine the time of the inspection intervals are used. For example, the following table can be used for:

Table 2 When inspection time intervals determined on an annual basis for pipelines and fixed equipment.

The criticality	**Grade 0**	**Grade 1**	**Grade 2**	**Grade 3**	**The consequences**
1	2	N/A	N/A	N/A	H
2	2	4	N/A	N/A	H/M
3	2	4	6	8	H/M/L
4	3	6	8	10	M/L
5	3	N/A	8	12	L
Failure	High	Average	Low	Inconsiderable	

B) The purpose of inspections: The purpose of the inspection is determined by the consequences of failure. Subjects with a high incidence consequence of a minor purpose of inspection are required; General Purpose and objectives limited to cases with implications for the outcome of the average low is determined.

C) The inspection method: Determine NDT (non-destructive testing) is based on the probability of failure.Appropriate methods for the detection of possible failure modes are selected.For example, some of these methods are presented in Table 3:

Table 3 Inspection methods (NDT) supplementary.

Type of failure	Mechanism	NDT method
Internal erosion Parapet	Internal corrosion Abrasion Cavitation Welding corrosion	Ultrasonic Radiography
External erosion Parapet	External corrosion Corrosion under insulation	Visual inspection Radiography Thermography
Cracking	Fatigue Stress corrosion Hydrogen crack	Ultrasonic Radiography Magnetic particles Liquid penetrant
Etc.	Creep Damage Hot hydrogen Tenderness high temperatures	Ultrasonic Radiography Particles Magnetic

A comprehensive review:

One of the objectives of this comprehensive review to ensure that all the data on the degree of the crisis has been effective, still have impact and that data relating to the history overhauled involved in the calculation of failure. In a comprehensive review of new items added to the list of assessment and inspection results will be discussed comprehensively. Generally, the purpose of the review is to:

1. Any add, delete or modify the list of equipment to be determined.
2. The actual conditions of their adaptability to be confirmed.
3. Speed and failure mechanisms to be determined.
4. Level of confidence in the prediction of failure can be determined.

Procedure: RBI

There are three ways to perform risk-based inspections: Internal, Consulting, Internal composition and consultation.

With fewer side assess internal personnel costs method has advantages and knowledge of the team RBI single. The disadvantage of this method is that during the execution of their daily tasks to team members as well RBI and that team members may not be familiar with the tools and methods RBI and in case of interference with everyday tasks RBI course they should be held at a later time period. RBI benefits of counseling by staff members of the team have sufficient skills well it can focus on the project, while disadvantages include they lack sufficient knowledge about the unit and the lack of adequate understanding of the results of internal personnel after completion of the project, which makes the results achieved by the consulting team after going from unit inapplicable to the archives is limited.Hybrid approach, personnel consulting with internal staff to efficiently benefit from the advantages of both.This method can be extremely rewarding to have the unit in addition to internal personnel as well RBI learns the concepts and applications.With the introduction of risk-based inspection (RBI) in oil and gas and petrochemical following advantages are evident: A better understanding of probability and consequence of failure is leading to a better ability to control and monitor. It is also anticipated failures caused accidents and securely access relevant unit will be reliability and confidence level. Application of

Risk Based Inspection (RBI) is makes the cases with less risk at longer time intervals inspection.
Inspection methods are planned and On-Line instead of the traditional method effectively reduces Off-Line:

- Stop frequently during an inspection system
- Inspection costs (direct costs)
- Reducing production costs (indirect costs),
- Reducing the manpower required for inspection.

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