

Hazard Identification and Risk Analysis of a Blow Room Unit in Bale Opener Process

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ABSTRACT- The textile industry is the leading manufacturing sector to improve the economy of the nation. After agriculture, the textile industry generates the second-largest employment opportunity in India. The textile industry poses the highest risk compared to other engineering industries. The textile industry consists of several units in all process area, the most fireplaces have several reasons that are static electricity, overheating, human error, environmental atmosphere, and failure of electrical components in the machine, along with this some of the things which can create very harmful risk. The RPN has been found out for all the hazards in the textile industry, risk rating has been calculated from the point of view from the Ergonomics survey and hazard, identify tools HIRA and FTA are done for the hazard with the highest RPN number. Different control measures were identified and suggested to ensuring the safety of the workforce in the factory.

Keywords: Hazard identification risk analysis (HIRA), Fault tree analysis(FTA), Risk priority number (RPN).

I. HAZARD IDENTIFICATION:

Potential risks in various activities, fault tree analysis & hazard identification, and risk analysis tools are used to identify the risk level in the blow room process by the result of hazard identification and risk analysis, Bale plucker process was identified with heavy risk. In cotton, bales contain some foreign particles In the natural and synthetic bale foreign particles such as coin, metal button, broken seeds, plastic strips that will deposit in a bale. That impurity contains cotton that will hit the beater at high speed, produces a spark resulting in a fire. That fire will overly spread the machine through ducting can be highly spread of fire through all machinery.

II. CAUSES OF SPARKS AND FIRES TAKEN IN BALE OPENER MACHINE:

- “Hot Bales” from the Gin
- Stones in Cotton Bales
- Stray Metal & Wire in Bales
- Loose Metal from Machines
- Electrical Short Circuit
- Friction and Choke Up

III. LITERATURE REVIEW:

The hazards happening in the Textile industries are Mechanical Hazards, physical hazards, chemical hazards, Ergonomic hazards, and physiological hazards

1. [padmini D.S et al., 2010]. Education is the fundamental right that helps the growth of the nation. The education helps the workers to get knowledge about medical rights, legal and social behavior. The people are uneducated most of them do not know OHS at the workplace. The Company unaware and lack of OHS some of them are training, housekeeping, accident prevention, hospital facility, safety signs
2. [Zorawar Singh, 2015]. The study showed that the textile industry workers exposed to dyes, solvents, and fiber dust are more prone to different health-related problems. Textile workers should change their working methods and use proper protective equipment to minimize exposure to different chemicals.
3. [Abdul Wali Khan et al., 2015]. There are poor working conditions in the cotton industry in Pakistan where workers are exposed to different occupational hazards. More health symptoms were reported from small weaving factories (power looms). There is a dire need for improvements in occupational health and

അപകടസാധനങ്ങളുടെ (Ergonomics) പട്ടിക

സ്ഥലം: **chokalingam** തീയതി: 15/05/2018

പേര്: **Meek**

ക്രമ നമ്പർ	അപകടസാധനം	പ്രകാശം	മുൻപ്	ഇപ്പോൾ	പരിഹാരം
1	വൈദ്യുത കമ്പോളം സുരക്ഷിതമാക്കിയിട്ടുണ്ടോ?			✓	
2	വൈദ്യുത കമ്പോളം സുരക്ഷിതമാക്കിയിട്ടുണ്ടോ?			✓	
3	വൈദ്യുത കമ്പോളം സുരക്ഷിതമാക്കിയിട്ടുണ്ടോ?		✓		
4	വൈദ്യുത കമ്പോളം സുരക്ഷിതമാക്കിയിട്ടുണ്ടോ?		✓		
5	വൈദ്യുത കമ്പോളം സുരക്ഷിതമാക്കിയിട്ടുണ്ടോ?		✓		
6	വൈദ്യുത കമ്പോളം സുരക്ഷിതമാക്കിയിട്ടുണ്ടോ?		✓		
7	വൈദ്യുത കമ്പോളം സുരക്ഷിതമാക്കിയിട്ടുണ്ടോ?		✓		
8	വൈദ്യുത കമ്പോളം സുരക്ഷിതമാക്കിയിട്ടുണ്ടോ?		✓		
9	വൈദ്യുത കമ്പോളം സുരക്ഷിതമാക്കിയിട്ടുണ്ടോ?		✓		
10	വൈദ്യുത കമ്പോളം സുരക്ഷിതമാക്കിയിട്ടുണ്ടോ?		✓		
11	വൈദ്യുത കമ്പോളം സുരക്ഷിതമാക്കിയിട്ടുണ്ടോ?		✓		
12	വൈദ്യുത കമ്പോളം സുരക്ഷിതമാക്കിയിട്ടുണ്ടോ?		✓		
13	വൈദ്യുത കമ്പോളം സുരക്ഷിതമാക്കിയിട്ടുണ്ടോ?		✓		
14	വൈദ്യുത കമ്പോളം സുരക്ഷിതമാക്കിയിട്ടുണ്ടോ?		✓		
15	വൈദ്യുത കമ്പോളം സുരക്ഷിതമാക്കിയിട്ടുണ്ടോ?		✓		

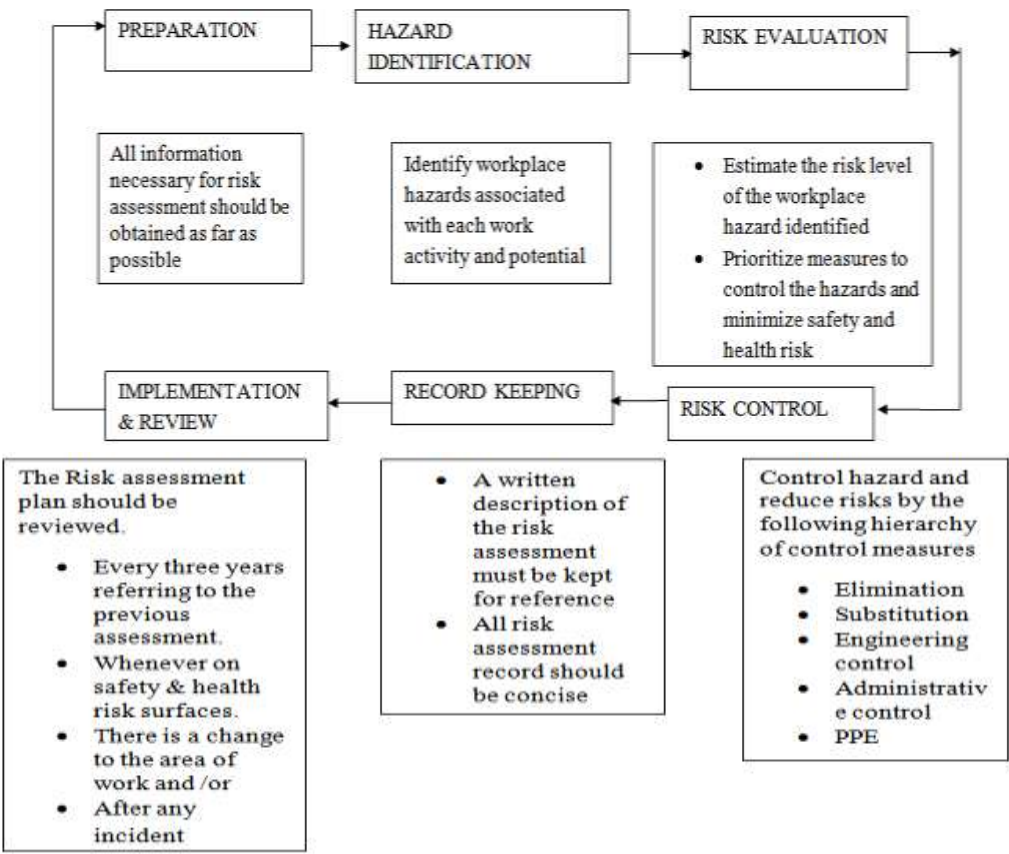
chokalingam

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V. RISK MANAGEMENT:

Risk Management is the Identification, Analysis, and Economic Control of those RISKS which can threaten the Assets (Property, Human) or the Earning Capacity of an Enterprise.

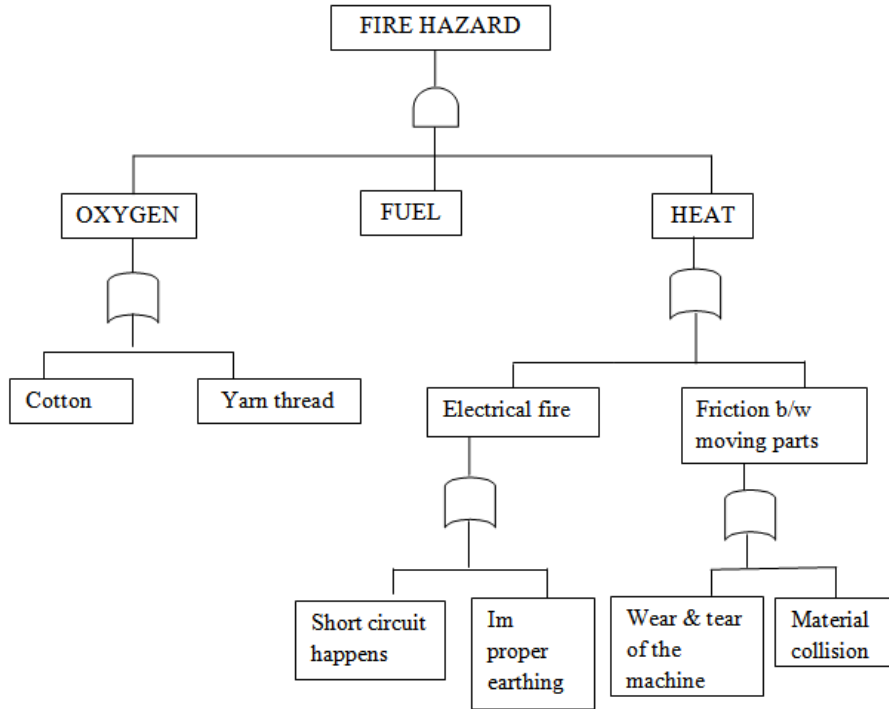
Chart 1 Risk assessment shall follow the 5 step process is given below.



VI. FIRE EXPLOSIONS CARRIED IN POWER LOOM:

FTA (FAULT TREE ANALYSIS) tool will be used for fire hazard on 12/02/2020 in B mill weaving

Chart-2 FTA for Fire hazard in cotton industries



- Dust accumulation in the power loom will get fire and spread to the end of the area which is pre-fire occurring with abnormal sound when machine running.
- Then the same spark will pass to the mud collection tank high explosion and noise fire will occur called secondary explosions. Hence in power loom dust on the machines, roof, windows, near coolant tank to be cleaned, and the mud collection tank also to be cleaned and closed.

VII. HIRA (HAZARD IDENTIFICATION AND RISK ANALYSIS)

Tool will be used to find out the risk place in the working region.

Hazard identification and risk assessment is a process and documentation of identifying the hazard, evaluation of risk, and applying suitable control measures to minimize the risk of harm by hazards at workplace.

Chart-3 HIRA:

HAZARD IDENTIFICATION RISK ASSESSMENT

N/AB/E		Risk ratings		Type		Risk Control measures	
N	Normal	S	Severity of hazards	P	Physical	A	Elimination
AB	Abnormal	L	Likelihood	C	Chemical	B	Substitution
E	Emergency	Legal	Legal consent	A	Airborne	C	Engineering Control
Risk Level				R	Routine	D	Administration Control
L (1-6)	Low			NR	Non - Routine	E	PPE
M (8-12)	Medium						
H (15-25)	High						
Severity Rating= S*L							
Significant risk = risk rating above 10 or legal requirements							

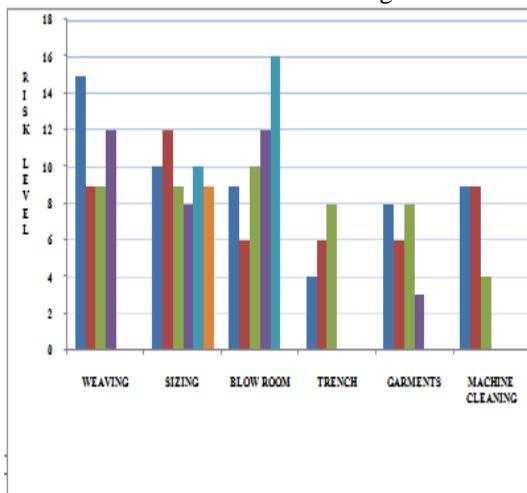
SL. NO	PROCES - ACTIVITY	OH & SAFETY HAZARD	R/NR	N/A/B/E	Type	ASSOCIATED RISK	S	L	Rating (S * L)	Risk level	Legal Requirement / N	SI & WI (Safety Procedure)	Present Practice/ Safeguards/ Control Measures					Additional Controls
													A	B	C	D	E	
1 WEAVING																		
1.1	The Risk of an electrical fire in the control panel due to micro dust particles deposition and H.V cable contacts with the earthing line make fire (12/02/2020).	Electric shock/ Loss of life.	R	A B	P & A	Loss of life Property loss.	4	3	12	M	Yes	SI& WI	-	-	A loosely hanging wire to be properly insulated and covered it.	Awareness has been given and to ensure proper handling of the electrical equipment.	-	Schedule check the H.V line.
1.2	B mill weaving machine oil lubrication filling, the oil spillage from the tank.	Slip, fire.	R	N	P	Property loss.	4	3	9	M	N	SI& WI	-	-	To be installed level indicator in the oil tank.	-	-	Keep that place clean and remove the oil spills timely.
1.3	Weaving machine thread link.	Finger crushing.	R	N	P	Punching injury.	3	3	9	M	Y	SI& WI	-	-	Monitor in gap parts movement	To provide necessary training & skill development	-	Schedule check the emergency stopper switches.

2.2	In sizing hot pasta spillage from a pipeline	Skin problem.	R	N	P	Burn injury.	4	3	12	M	N	SI&WI	-	-	To check and change the gas ket in the flange.	-	To provide heat	Not required.
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VIII. GRAPHICAL REPRESENTATION OF HIRA SHEET RISK VALUE :

The graph shows the result risk level is high in the blow room process compared with another process. To avoid a fire in the bale opener machine some additional control measures will be recommended.

Chart 4 Hira tool risk rating value



IX. RISK ASSESSMENT IN BALE OPENERS:

- The raw material of the first stage feeding tons of cotton.
- The abnormal impurities are very rarely the presence of any impurity are (Hot Cotton, broken seeds, Small Stones. Plastic strip).
- when Cotton is fed into a bale's plucker despite of the magnetic sieves provided in the machine, many times the iron Particles give high risk to a spark due to mechanical friction.
- Spark under a Bale plucker can flash over an entire cotton bale lay down in seconds for this dangerous Situation controlling this System is useful.
- This System detects and controls the fire to protect the valuable machine and cotton bales.
- The spark detector located inside the bale plucker rotates.
- If any detect single to spark the spark detector will activate and the signal will pass to Control Panel an automatic fire extinguisher will pass the water and control the fire at the same time fire sound alarm will produce sound at the same.

- The machine will shut down to save the Machine and raw materials from the dangerous situation.

X. CONCLUSION

- The hazard involved in the blow room process is found by HIRA (Hazard Identification and Risk Analysis) tool risk rating value is compared with other hazards the maximum risk rating value is found to be harmful in the bale opener machine process. In the raw material contains some impurity particles may cause a fire to spread the machine and raw materials to avoid this critical situation to control the fire in the machine additional safety measures needed to reduce risk. So that recommended installing the automatic fire extinguisher to control the hazard avoids loss of property.
- Unsafe conditions exist everywhere around the machine, it's possible to injure the workers, Suggestion for installing interlocked light barrier sensor. When the guard is opened or removed, the tripping mechanism power automatically shuts off the moving parts of the machine and the machine cannot be started until the guard is back in place.

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