

Risk Assessment and Prevention

in
Textile Industry



Fig. 1 by BG ETEM

Topics

- Typical heavy Accidents
- Causes of danger / technical reason or wrong behaviour?
- Main occupational diseases in textile industry
- Methodology of risk assessment and risk reduction
- Summary

Methodology of risk assessment and risk reduction

Safety:

- Situation free from indefensible risk or without any hazards

Occupational safety:

- The health and well being of people employed in a work environment (www.businessdictionary.com)
- Is an area concerned with the safety, health and welfare of people engaged in work or employment (www.wikipedia.org)

Methodology of risk assessment and risk reduction

- Connection between safety and risk

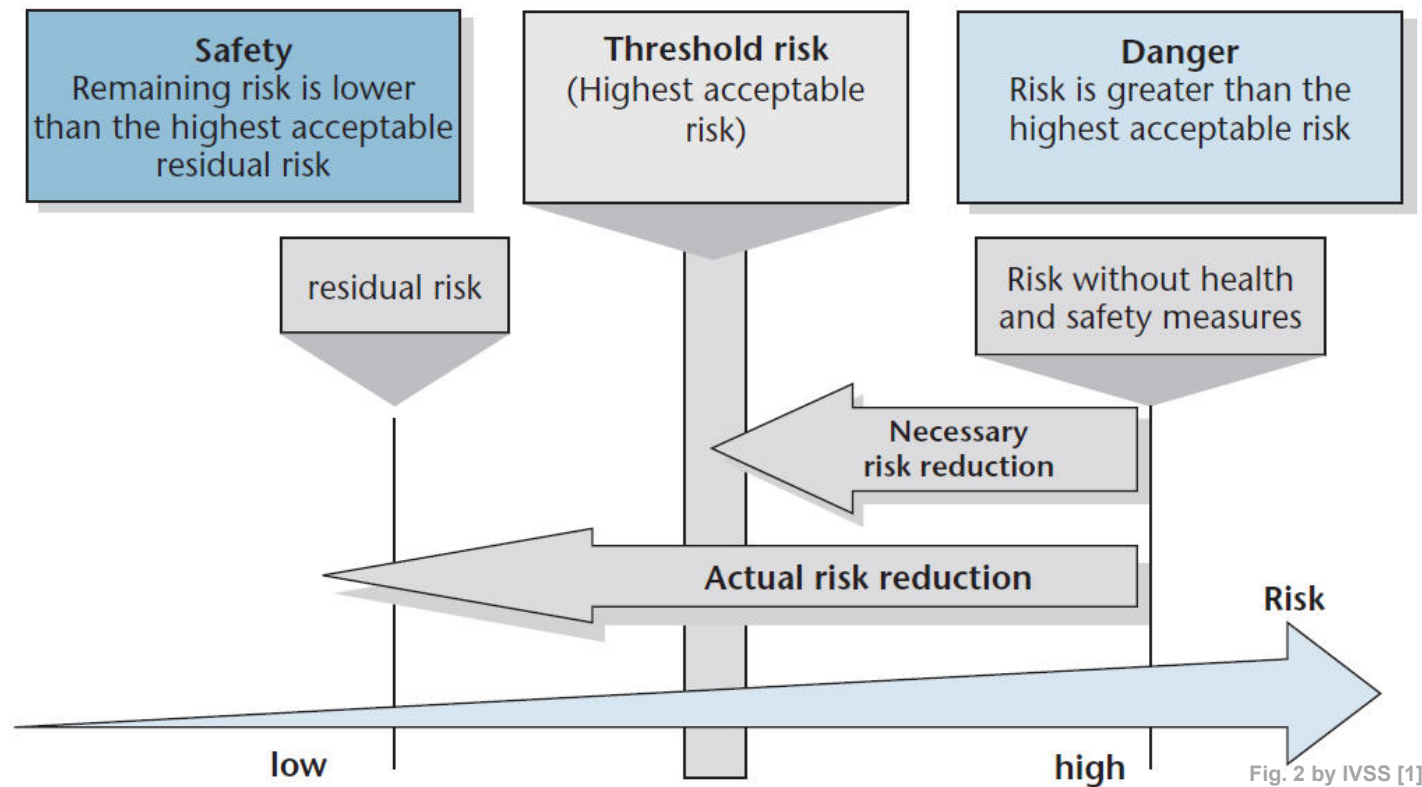


Fig. 2 by IVSS [1]

Methodology of risk assessment and risk reduction

- I. Law, regulations
- II. Experience
- III. Estimation

Methodology of risk assessment and risk reduction

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Matrix for qualitative risk estimation (example)

	Consequence	Probability of occurrence of harm			
		practically impossible	unlikely	possible	almost certain
1	minor cuts, bruises, bumps (first aid injury – no time lost)	1	2	3	4
2	disabling injury (lost time < 8 days)	2	4	6	8
3	serious injury, occupational disease	3	6	9	12
4	fatality	4	8	12	16
5	multiple fatalities	5	10	15	20

Methodology of risk assessment and risk reduction

Risk	consequences	Probability of occurrence of harm			
		unlikely	likely	very likely	Almost Certain
1- Negligible - HS Physic	Minor 1			3 Physical strain	4 Hazardous substance (special impact Model)
2- Low risk - Mech + Electric	First Aid 2			6 Mechanical Hazards	
3- Moderate Risk - Mental Physic	Major 3				12 Physical impact 12 Mental stress
4- High Risk	Fatality. 4		8 Fire 8 Electrical		

Risk

- 1- Negligible - HS Physic
- 2- Low risk - Mech + Electric
- 3- Moderate Risk - Mental Physic
- 4- High Risk

Probability

- (Annually) unlikely (1)
(Biannually) likely (2)
(weekly) very likely (3)
(daily) Almost certain (4)

Consequences.

- Minor (1)
First Aid (2)
Major (3)
Fatality (4)

- Her 1-4 Minor
5-8 Low Risk
9-12 Moderate
13-16 High Risk

Task 1: Setting up the Machine

Risk.

- 1- Negligible
- 2- Low risk
- 3- Moderate Risk
- 4- High Risk.

Probability.

- 1- Unlikely
- 2- likely
- 3- very likely
- 4- Almost Certain

Consequences.

Minor
First Aid
Major
Fatality

1-4 Minor
5-8 Low Risk
9-12 Moderate
13-16 High

Handling
~~and Supervision.~~

Chemical
~~Handling~~

Task 3:

Consequences	Probability of occurrence of harm			
	Unlikely	likely	very likely	Almost Certain
Minor	clinical 1		1 other hazards.	4 noise
First Aid		4 B + Thermal	6 mechanical	8 Physical strain
Major				12 Fine Mental
Fatality		8 Electrical		16 Hazardous Substance












1. Mechanical hazards		1.1 unprotected moving machine parts ✓	1.2 parts with dangerous surfaces ✓	1.3 movable transportation equipment, movable work equipment ✓	1.4 uncontrolled moving parts	1.5 falling, slipping, tripping, twisting one's foot ✓	1.6 falling from height	4+3	12
2. Electrical hazards		2.1 electric shock ✓	2.2 electric arcs	2.3 electrostatic charge ✓				5+4	20
3. Hazardous substances		3.1 gasses	3.2 vapours ✓	3.3 aerosols	3.4 liquids ✓	3.5 solids		3+4	12
4. Biological hazards		4.1 infection hazard through pathogenic microorganisms (e.g. bacteria, viruses, fungi) ✓	4.2 allergenic and toxic substances from microorganisms					3+2	6
5. Fire and explosion hazards		5.1 fire hazard through solids, liquids, gasses ✓	5.2 explosive atmosphere	5.3 explosive substances ✓				3+3	6
6. Thermal hazards		6.1 hot materials/surfaces ✓	6.2 cold materials/surfaces					1+4	4
7. Hazard through special physical impact		7.1 noise $2 \times 2 = 4$	7.2 ultrasound, subsonic noise	7.3 whole-body vibrations	7.4 hand-arm vibrations	7.5 non ionising radiation	7.6 ionising radiation	7.7 electromagnetic fields ✓	7.8 negative pressure, overpressure
8. Hazards through work environment conditions		8.1 climate ✓	8.2 lighting, light ✓	8.3 drowning				3+3	9
9. Physical strain		9.1 heavy dynamic work	9.2 one-sided dynamic work	9.3 static work	9.4 combination of static and dynamic work ✓			1+2	2
10. Mental factors		10.1 insufficiently designed work tasks	10.2 insufficiently designed work organisation	10.3 insufficiently designed social conditions	10.4 insufficiently designed conditions of workplace and work environment ✓			3+2	6
11. Other hazards		11.1 through humans ✓	11.2 through animals	11.3 through plants and vegetable products				1+2	2

Figure 2: Classification of hazard factors

1-4 - Acceptable Risk
5-10 - Low Risk

11-15 - Medium
16-20 - High

Methodology of risk assessment and risk reduction

RISK ASSESSMENT MATRIX:

		Probability					
		Remote	Unlikely	Possibility	Probability	Very Likely	Certain
Severity	No Injury	0	1	2	3	4	5
	Minor Injury	1	1	2	3	4	5
	First Aid Injury	2	2	4	6	8	10
	3 Day Injury	3	3	6	9	12	15
	Major Injury	4	4	8	12	16	20
	Fatality/Disability	5	5	10	15	20	25

Low	1 – 6	Monitor	Tolerable risk. No additional controls required. Employees made aware of safe/correct system of work.
Medium	8 – 12	Improvement	Action required to further reduce risk to acceptable level. Review of process or activity.
High	15+	Immediate Action	Unacceptable risk. Stop activity immediately. Inform next level of management & refer to Safety Coordinator. Possible withdrawal of process or activity.

Monitoring and Review

Review & Approved By	Job Title	Date	Signature

Methodology of risk assessment and risk reduction

Department/Section Area/Others		Boiler, Generator, Quality, Turning, Yarn Doubling	
Risk Assessment			
Signature			
Date:			
Revision:			

Sr #	Activity	Hazard	Those at Risk	Risk Rating			Existing Risk Control			Additional Risk Control	Residual Risk		
				P	S	RR	Engineering	Administrative	PPEs		P	S	RR
1	Working in boiler area	Smokes	Employees working in boiler area	4	3	12	Cyclon system has been installed used to remove the dust particles from smoke release by boiler. bloor has also been installed to eject the smoke from cyclon and release it in air at legal height through chemnies.	AET and SPM tests have been conducted. Emission source point poster has been placed.		Training about smoke hazards and procedure how to protect by smoke if control device failed.	1	1	1
2	Working in Generator Room	Smokes	Employees working in generator room	4	3	12	Smoke filter has been installed that filter the dust particles from the smoke and then release smoke in air at legal height through chemnie.	AET and SPM tests have been conducted. Emission source point poster has been placed.		Training about smoke hazards and procedure how to protect by smoke if control device failed.	1	1	1
3	Working in quality hall	Fluff	Employees working in quality hall	3	3	9			Dust masks have been provided.	Training about hazards of fluff and benefits of using PPE's and disadvantages of not using PPE's has been given to quality section employees.	1	1	1

Methodology of risk assessment and risk reduction

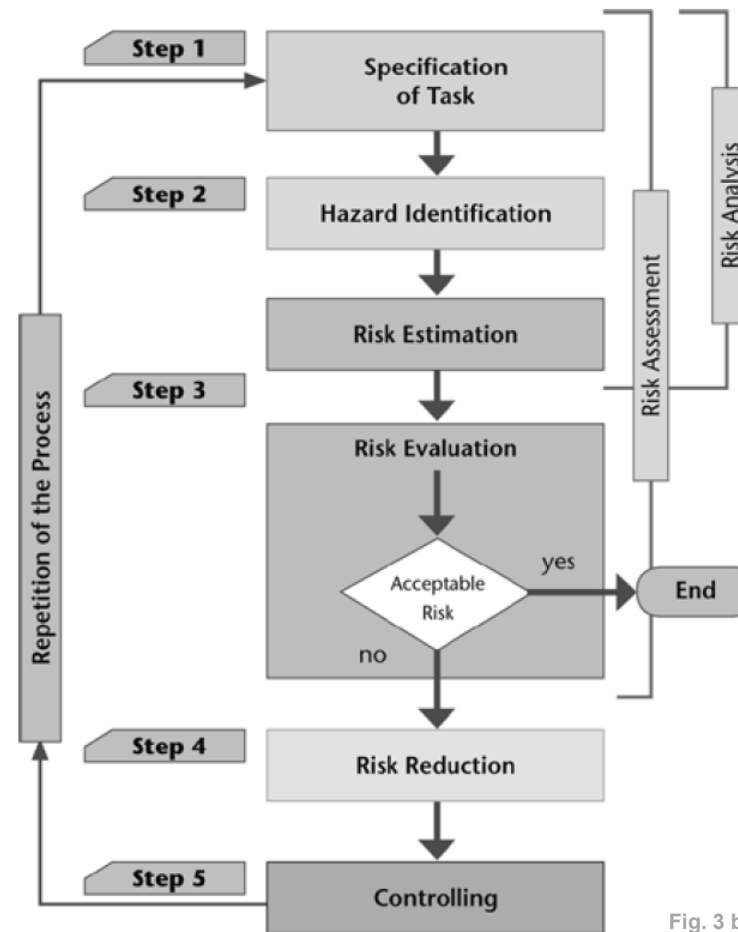


Fig. 3 by IVSS [1]

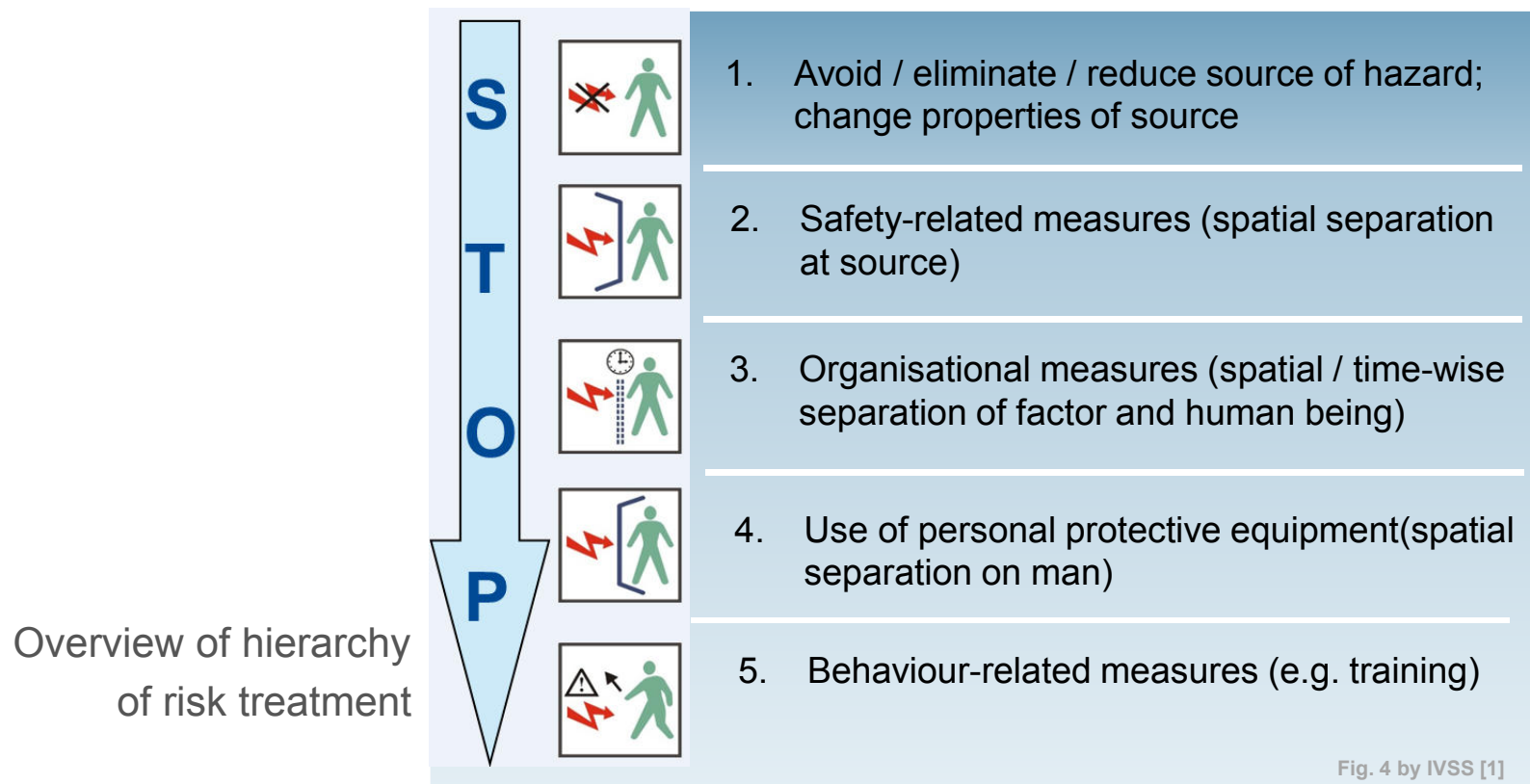
Methodology of risk assessment and risk reduction

Risk reduction (selecting and taking measures)

- Removal or minimisation of a risk must be the first option, must be preferred before behaviour-related measures
- the hierarchy of control options is basically:
 1. **Elimination**
 2. **Substitution**
 3. **Technical solution** (safety device, ventilation, isolation)
 4. **Personal solution** (teaching, training, Personal protective equipment)
- Personal solution are the last opinion to cover the remaining risks

Methodology of risk assessment and risk reduction

Risk reduction (selecting and taking measures)



Methodology of risk assessment and risk reduction

Risk reduction (selecting and taking measures)



1. Avoid / eliminate / reduce source of hazard;
change properties of source

Measures against hearing loss by:

- buying more quiet machines

Methodology of risk assessment and risk reduction

Risk reduction (selecting and taking measures)



2. Safety-related measures (spatial separation at source)

Measures against hearing loss by:

- in-housing of machinery

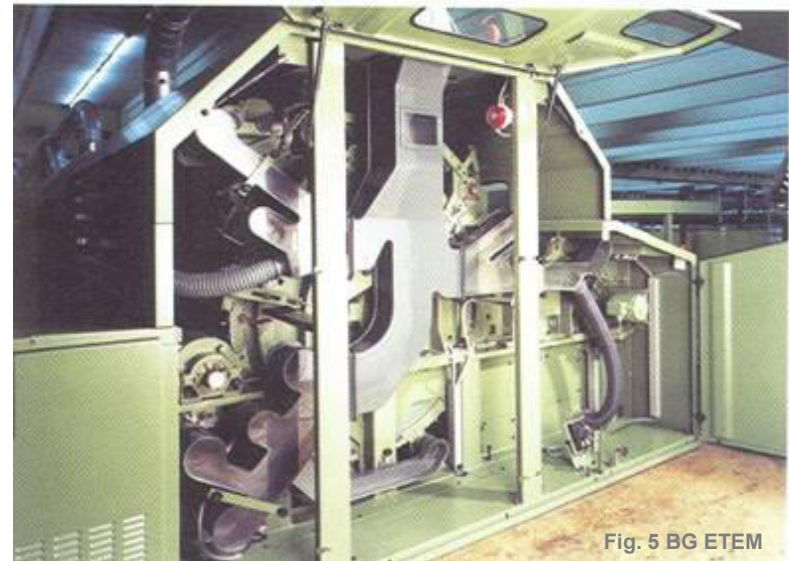


Fig. 5 BG ETEM

Methodology of risk assessment and risk reduction

Risk reduction (selecting and taking measures)



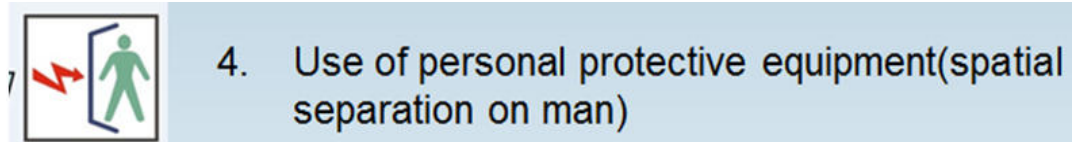
3. Organisational measures (spatial / time-wise separation of factor and human being)

Measures against hearing loss by:

- seperate worker from the noice if it is possible
- scheduled cervices

Methodology of risk assessment and risk reduction

Risk reduction (selecting and taking measures)



Measures against hearing loss by:

- suitable ear protection for the employees
- protective medical check up



Methodology of risk assessment and risk reduction

Risk reduction (selecting and taking measures)



5. Behaviour-related measures (e.g. training)

Measures against hearing loss:

- information and training how to use the ear protection

Fig. 7 BG ETEM

Summary

- Risk assessment is the basis of prevention work in working environment
- It is a good tool for:
 - analysing risks
 - determine measures in a structured way
- In case of accident the employer can show that he has done his obligations and induced necessary measures.

List of references

- [1] 10 „ Risk Assessment – General Guide “, ISSA Section for Electricity, 2010