

Content-1: Introduction to Chemical Management

Orientation

What can this unit help you with?

You may use this unit if you

- Have to understand the idea of chemical management;
- Have to know about the hazardous chemicals and their impacts;
- Have to understand the significance of good chemical management from procurement to final disposal of chemicals.

Intended results of the unit

- Students have a general perspective on the impact of chemicals on different stakeholders;
- Students can assess the cost of poor chemical management in a factory;
- Students are capable of explaining the benefits of adopting good chemical management practices in a factory.

Input

Chemical management is a systematic approach of procuring, storing, and using and disposing of chemicals within a facility that ensures the greater wellbeing of the stakeholders and the world.

Chemicals can have various known and unknown effects on humans, animals and the environment. Unsafe handling of hazardous chemicals can pose extreme threats to our existence.

That's why we need to be mindful about the safe handling through every stage of a chemical's life from procuring to its disposal. Improperly managed chemicals can be highly dangerous and can potentially cause serious accidents that can cost a lot of money, even the lives of the workers, and jeopardize the condition of our health and the world. That's why, to handle the chemicals responsibly, we need to adopt good chemical management practices in the factory.

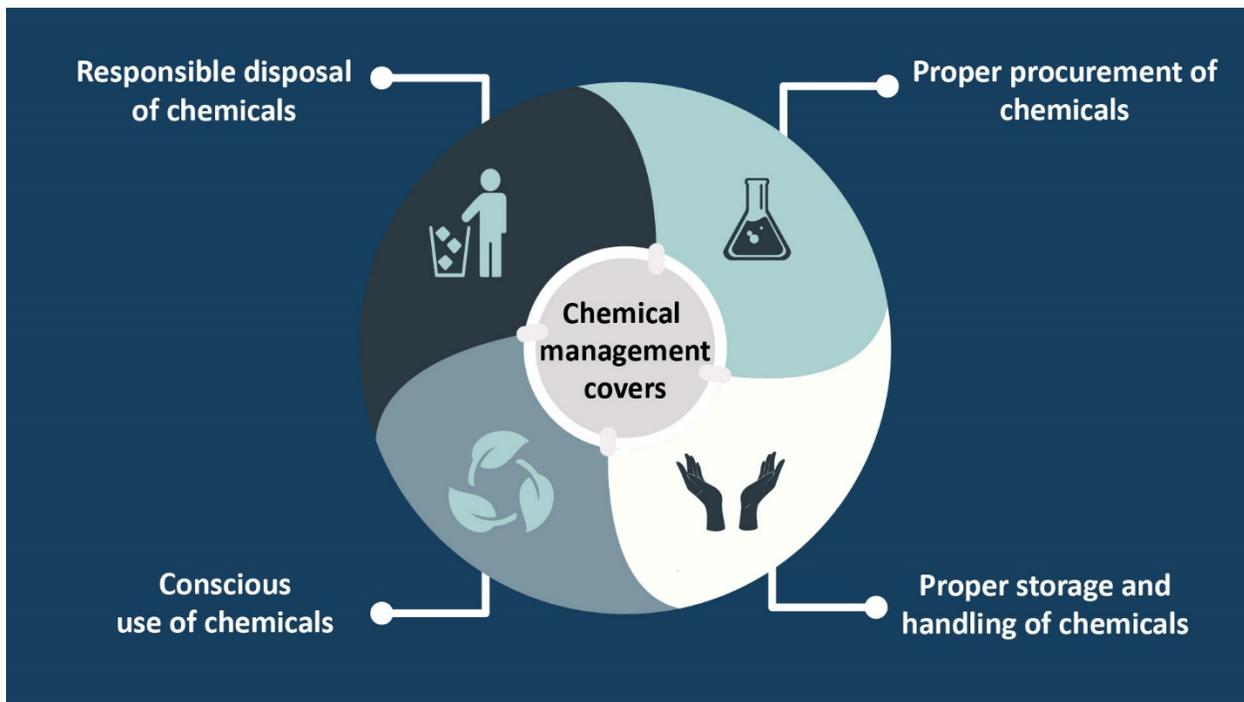


Figure 1: Introduction to Chemical Management. Picture courtesy: Kazi Farhan Hossain Purba.

What Is a Chemical?

Before discussing chemical management, let us recall what we know about chemicals. We know that a chemical is any substance that involves or results from a reaction between two or more substances, or relates to the substances that something consists of. For example, water (H₂O) is the most well-known chemical that results from the reaction between Hydrogen and Oxygen. There are thousands of chemicals, and different chemicals have different characteristics. Some chemicals are safe to use.

On the other hand, some are dangerous to our health and the environment. That's why these hazardous chemicals must be handled with care. Now we will talk about hazardous chemicals which are our main concern for chemical management.

What Is a Hazardous Chemical?

A hazardous chemical is any chemical or material in a quantity or form that poses a significant risk to health, safety, or the environment when transported, used, stored, or released if not managed correctly. These chemicals can be flammable, explosive, toxic, corrosive or radioactive, combustion-supporting, etc. So, whenever we have such hazardous chemical at hand, we need to be conscious about handling them.



Figure 2: Dealing with hazardous chemicals. Photo source: Reed Consultancy Bangladesh. Collage courtesy: Kazi Farhan Hossain Purba.

Chemicals impact

Chemicals can have a various known and unknown impact on employees, environment, consumers and community. Accidents or incorrect use of the hazardous chemicals discussed above can cause immediate health effects, such as skin, eye irritation or burns, or poisoning. They can also be responsible for long-term health effects due to people being exposed to them over a long time.

These hazardous chemicals can also damage natural resources like water, soil and other living beings. Hazardous chemicals have negative impacts on the consumers as well.

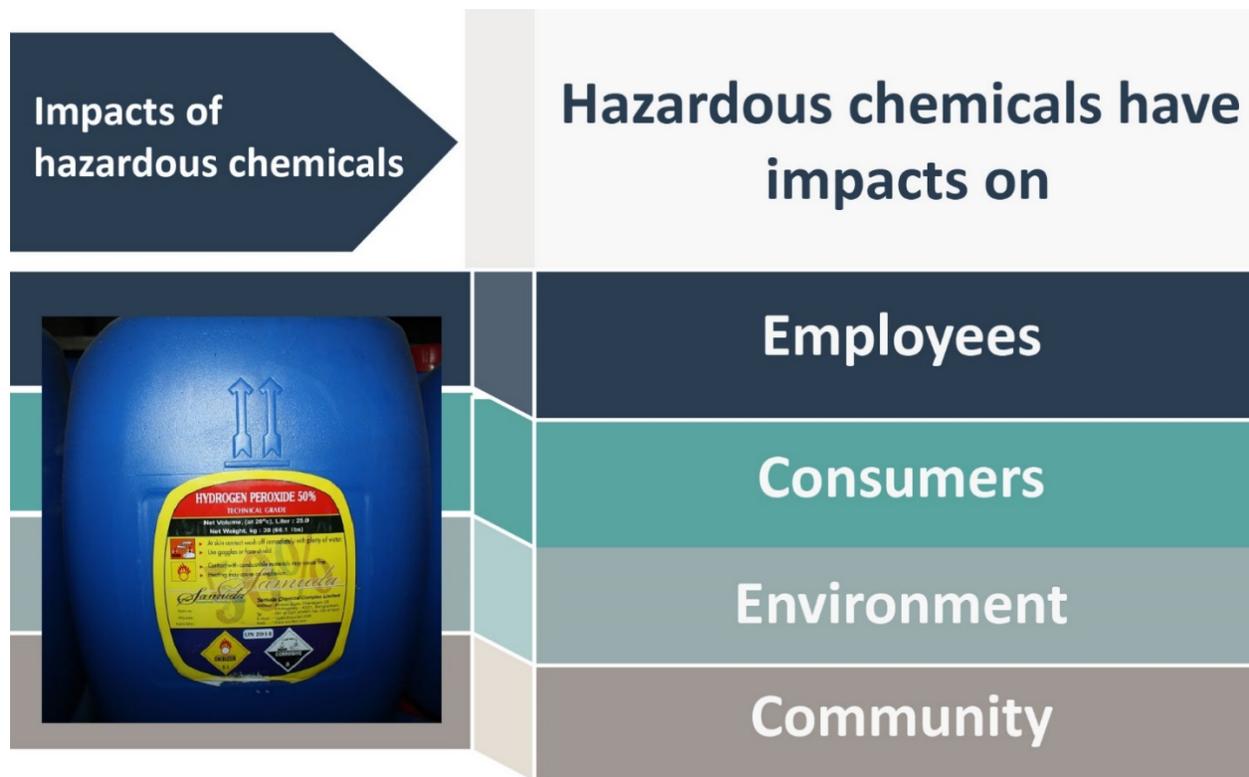


Figure 3: Impacts of hazardous chemicals can be on employees, consumers, environment and the community. Picture courtesy: Kazi Farhan Hossain Purba.

Cost of Poor Chemical Management

Chemical management may seem costly at first glance as we need to manage everything systematically where we have to ensure proper infrastructure, environment, legitimate documents, equipment, etc. But if we think deeply, chemical management pays off our hard work as the cost of poor chemical management is even more.

We can talk about the cost of poor chemical management in three parts:

1. Direct cost,
2. Productivity and
3. Trust.

Direct cost

When we have to pay the cost directly for the sake of improper chemical management, we count it as a direct cost.

- A factory faces a loss of materials from improper handling, application or storage. We can lose a lot of chemicals while weighing and pouring them to containers indifferently. Our indifference to the expiry date, irresponsible stocking of unnecessary chemicals can also lead to a lot of wastage which adds to our direct cost.

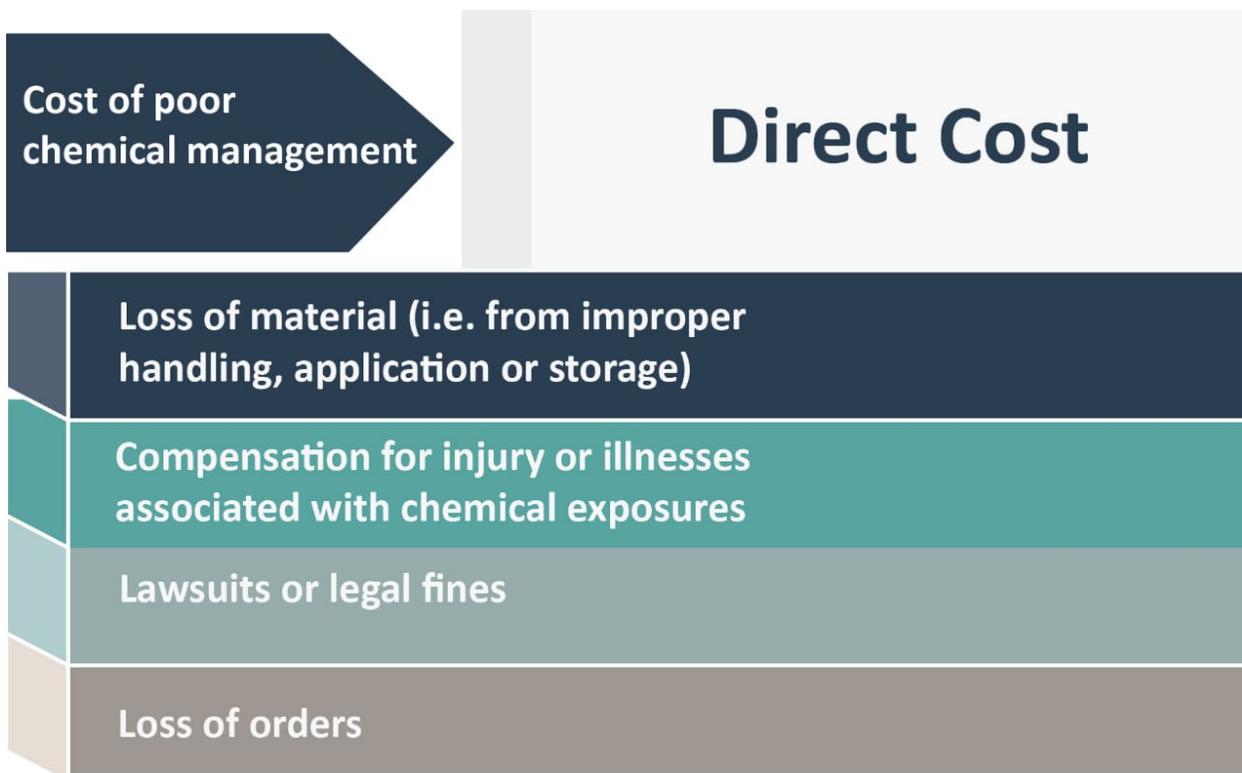


Figure 4: Direct cost of poor chemical management. Photo courtesy: David McBee from Pexels. Collage courtesy: Kazi Farhan Hossain Purba.

- Compensation for injury or illnesses associated with chemical exposures can be very costly. Moreover, chemical injuries can also cost lives. So, a severe injury can sometimes be irrevocable.
- Lawsuits or legal fines are also costly, and they can ruin the reputation of a company.
- As a result of the loss of reputation, poor chemical management can also cause a loss of orders.

Productivity

- Workers' injury or illnesses can cause absenteeism which results in poor productivity. Accidents involving chemicals can create closure of companies. Thus, poor chemical management plays a great role in the loss of productivity and financially affects companies.

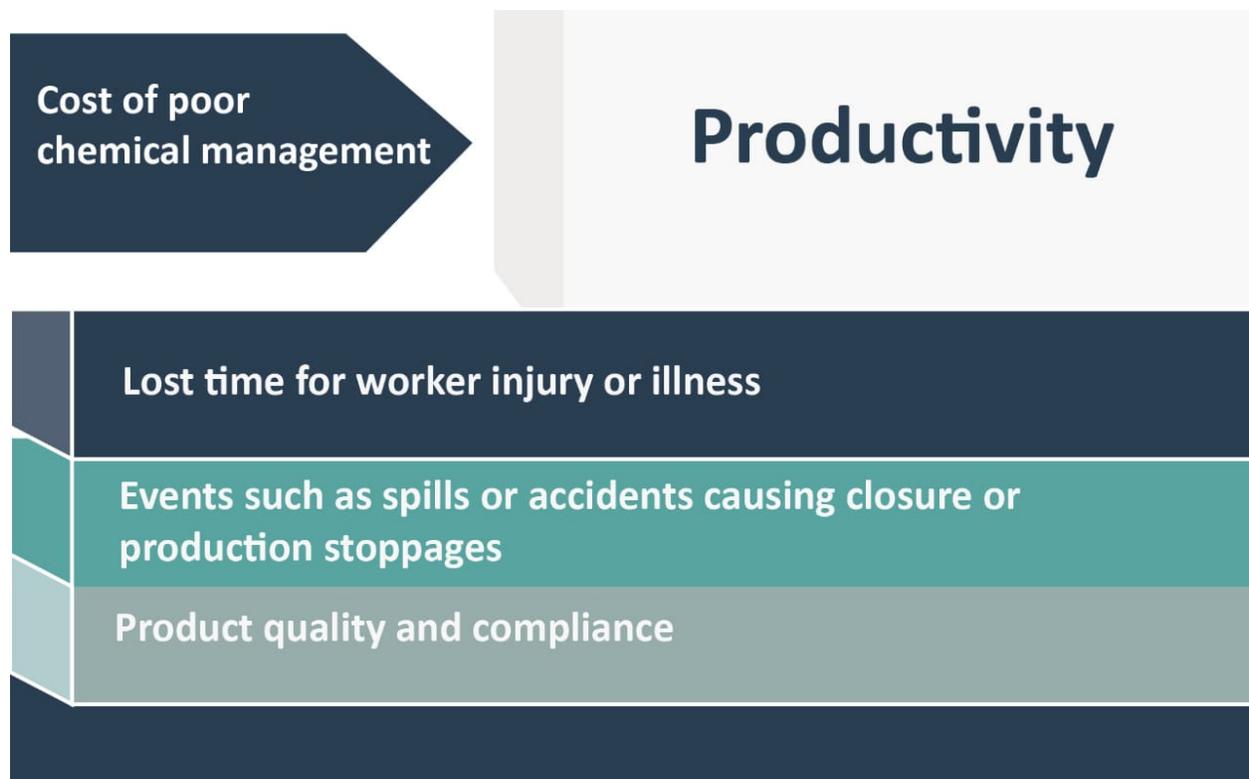


Figure 5: Productivity cost of poor chemical management. Photo courtesy: David McBee from Pexels. Collage courtesy: Kazi Farhan Hossain Purba.

- Events such as spills or accidents cause closure or production stoppages which hamper productivity.
- Product quality and compliance-failures decrease productivity which can be caused by poor chemical management.

Trust

- Loss of customers' and workers' trust can affect the goodwill of a factory in the long run.
- Failure to comply with the MRSL (Manufacturing Restricted Substances List), RSL (Restricted Substances List) issues can deteriorate the trust from the buyers and companies can miss the opportunities to have repeated orders.



Figure 6: Cost of poor chemical management (Deterioration of Trust). Photo courtesy: David McBee from Pexels. Collage courtesy: Kazi Farhan Hossain Purba.

Benefits of Good Chemical Management

There are a lot of benefits of good chemical management. If we can adopt the practice of good chemical management, we can get the following benefits:

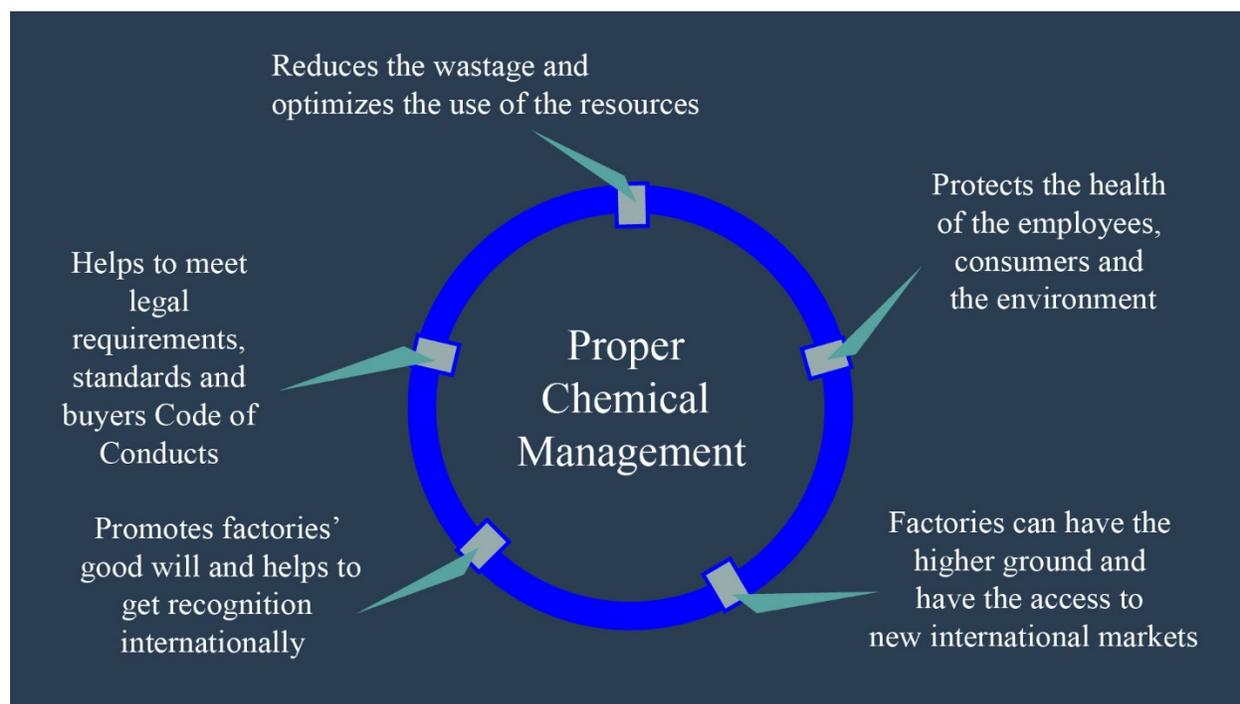


Figure 7: Benefits of good chemical management. Picture courtesy: Kazi Farhan Hossain Purba

Proper chemical management reduces costs, increases competitiveness and improves workers' health and safety.

Reduction of costs

Chemicals may present a major part of the production cost for companies. Any action that can be taken to reduce use, loss, waste, contamination and expiry of these substances brings cost savings to companies. Moreover, reducing the amount of expired chemical disposal will also reduce environmental impact.

Increase in Competitiveness

Brands and consumers do not want to see harmful chemicals put into products or the environment. By identifying and reducing the use of banned chemicals and hazardous substances, companies can improve their competitive position and social or environmental responsibility reputation.

Improvement of Workers' Health & Safety

Accidents involving chemicals create additional costs for companies in lost materials, damaged equipment, facilities, and workers' injuries.

Reducing health and safety risks for employees improves their motivation and productivity and lessens absenteeism due to worker injury and illness.

Conclusion

If we manage chemicals properly, we can ensure a safe working condition and a healthy workforce. By managing chemicals, we can comply with local, international legislation, buyers' code of conduct, and societal demands. Moreover, if a factory manages chemicals meticulously, they have higher ground and have access to new international markets.

Proper chemical management can also lead the factories to reduce the wastage. It can optimize the use of the resources that will be cost-effective for the factory while protecting the health of the employees, consumers and the condition of the environment.

So, we can see that chemical management is not costly at all. Rather it is an investment for long term business and to improve the goodwill of a factory.

Didactical elements

Quizzes and self-tests:

True-false

1	Workers' injury or illnesses due to hazardous chemical exposure can cause absenteeism which results in high productivity	
	<ul style="list-style-type: none">▪ Correct▪ False	False
2	A hazardous chemical is any chemical or material in a quantity or form that poses a risk to health, safety, or the environment when transported, used, stored, or released.	
	<ul style="list-style-type: none">▪ Correct▪ False	Correct
3	Chemical management is costly. So it is better not to manage.	
	<ul style="list-style-type: none">▪ Correct▪ False	False
4	Indifference to the expiry date, irresponsible stocking of unnecessary chemicals can lead to a lot of wastage which adds to factory's cost.	
	<ul style="list-style-type: none">▪ Correct▪ False	Correct
5	Good chemical management only protects the health of the employees.	
	<ul style="list-style-type: none">▪ Correct▪ False	False

Open Questions:

1	Why do you think it is necessary to adopt proper chemical management in chemical storage?	
	<i>Open text</i>	Good chemical storage practices cover all the activities related to awareness building among the workers about the properties of the dangerous substances, their safe storage, storage conditions and the ways to prevent and handle unwanted circumstances. Without good practices, improper storage of the incompatible and dangerous substances, inappropriate storage conditions with respect to the hazards of the substances can cause massive accidents. That's why it is very important to adopt common good practices in chemical storage.

Choose multiple:

1	What can be the benefits of good chemical management? (Choose multiple)	
	<ul style="list-style-type: none"> ▪ Helps to get a degree in chemistry. ▪ Reduces the wastages and optimizes the use of resources ▪ Helps to buy latest textile machines ▪ Helps to meet legal requirements, standards and buyers Code of Conducts ▪ Promotes factories' goodwill ▪ Protects the health of the employees, consumers and the environment 	<p>Answer:</p> <ul style="list-style-type: none"> ▪ Reduces the wastages and optimizes the use of resources ▪ Helps to meet legal requirements, standards and buyers Code of Conducts ▪ Promotes factories' goodwill ▪ Protects the health of the employees, consumers and the environment

Sorting tasks:

Sort the words to the correct sentences:

closure	motivation	injury	lost	spills	additional
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1. Accidents involving chemicals create__ costs for companies in terms of __ materials, damaged equipment and facilities and workers' __.
2. Events such as __ or accidents cause__ or production-stoppages.
3. Reducing health and safety risks for employees improves their__ and productivity.

Answers:

1. additional, lost, injury
2. spills, closure
3. motivation

Exercise:

Imagine the situation below and take action for the mentioned company:

Beautiful Colours, a tier two factory, has a busy schedule, and top management does not care much about chemical management. The factory faces casualties frequently for the indifference to handle chemicals properly. Not only this, the factory also suffers from the absenteeism of employees due to illness. The factory also fails to comply with MRSL, RSL requirements set by the buyers.

The workers in the factory always feel that the system could be improved to subdue the number of accidents in their factory premises, and they crave for a safer workplace. But for the interest of keeping costs down through cutting corners on safety and avoiding regulation, the factory is not currently focusing on the proper management of chemicals. For the company, you have to do the following tasks:

- Explain the cost of poor chemical management to the top management team of the factory.
- Demonstrate the factory why they need to adopt good chemical management practices.

Hotspots

Which photo is an example of poor chemical management?



Photo source: Reed Consultancy Bangladesh. Collage credit: Kazi Farhan Hossain Purba.

Answer: B

References/additional literature/links

1. Resource-efficient management of chemicals, PSES II, GIZ
2. To know about chemicals, you can go to the following link: <https://www.reagent.co.uk/what-exactly-is-a-chemical/>
3. More information on the storage of packaged dangerous goods can be found here: <https://www.safeworkaustralia.gov.au/chemicals#:~:text=Hazardous%20chemicals%20are%20substances%2C%20mixtures,chemicals%20that%20cause%20skin%20damage>
4. To know more about chemical management, you can visit the OIA Chemicals Management Toolkit from this link: <https://outdoorindustry.org/sustainable-business/chemicals-management/>
5. To know about the benefits of chemical management and the importance of maintaining the compliance issues, you can go through this interview: <https://www.textiletoday.com.bd/goal-common-protect-employees-consumers-environment/>

Unit Feedback

If you wish you can give us feedback on the learning unit here. This is of course, optional.

Technical Elements

How did the technical elements of the unit work for you? Did you have any difficulties?

Didactical Elements

How did the didactical structure of the learning unit work for you? Do you have any comments or suggestions to make it better?

Open

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