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## Booklets



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## Title: Standardized tool for the identification and control of risks associated with tasks in the work environment

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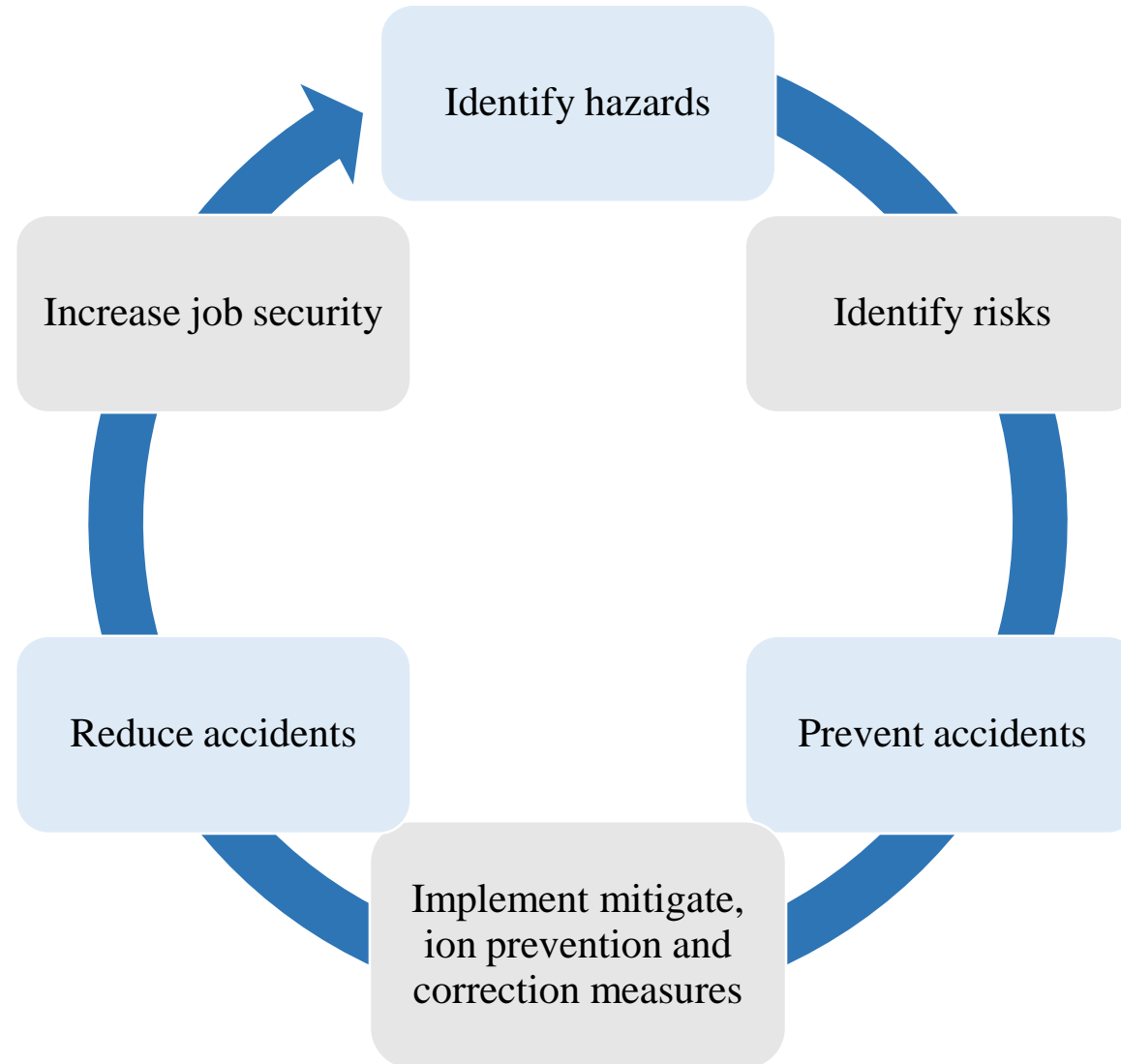
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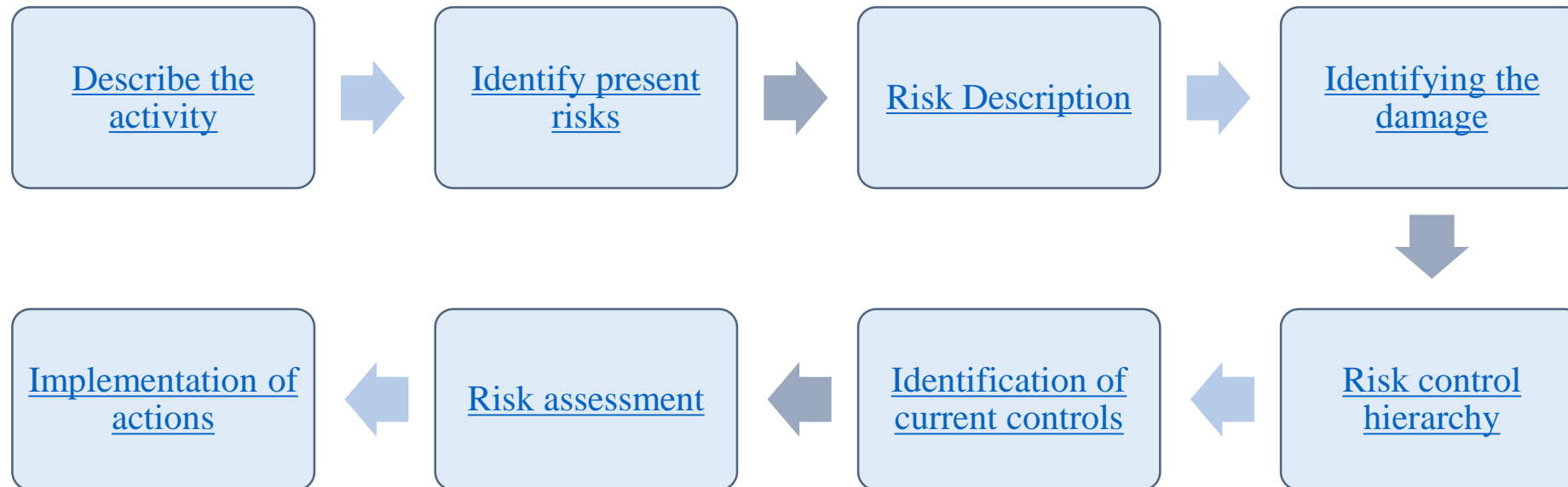
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# INTRODUCTION



# METHODOLOGY



# RESULTS

## Describe the activity

Num	Description of the activity
1	Check that the forks are in good condition.
2	Check that the grill is in good condition.
3	Before starting the operation, put on your seat belt.
4	Address the cargo for transfer.

## Identify present risks

Num	Possible risk
1	<ul style="list-style-type: none"> <li>• Mech.- burst/compression.</li> <li>• Work/walking surface-5S, Order and Cleanliness (Material on Surface/Out of Place Do).</li> <li>• Ergo .- Healthy postures or without excessive effort (Over Effort).</li> <li>• Lift truck / PIT-Equipment Conditions.</li> </ul>
2	<ul style="list-style-type: none"> <li>• Human error, human behaviour.</li> <li>• Work/walking surface-5S, Order and Cleanliness (Material on Surface/Out of Place Do).</li> <li>• Ergo .- Healthy postures or without excessive effort (Over Effort).</li> <li>• Lift truck / PIT-Equipment Conditions.</li> </ul>
3	<ul style="list-style-type: none"> <li>• Human error, human behaviour.</li> <li>• Ergo .- Healthy postures or without excessive effort (Over Effort).</li> </ul>
4	<ul style="list-style-type: none"> <li>• Mech .- Mass and speed (kinetic energy - uncontrolled movement).</li> <li>• Mech .- Impact.</li> <li>• Lift truck/PIT-Operating Environment.</li> <li>• Lift truck / PIT-Mis-Operation.</li> </ul>

## Risk Description

Num	Possible risk
1	<p>Mech.- burst / compression: trapping of hands when checking that the forks are in good condition.</p> <p>Work surface / walking-5S, Order and Cleanliness (material on the Surface / Out of Place Do): when carrying out the activity the employee may lose sight of the risk points around him and may trip.</p> <p>Ergo.- Healthy postures or without excessive effort (Over Effort): when carrying out the activity, the employee may end up in uncomfortable postures.</p> <p>Lift truck / PIT-Equipment conditions: failure to perform the activity correctly may cause the lift truck to malfunction, which may cause injury to the employee.</p>

Num	Possible risk
2	<p>Human error, human behaviour: when verifying that the grill is in good condition, the employee may lose sight of the risk points around him and may be hit.</p> <p>Work surface / walking-5S, Order and Cleanliness (material on the Surface / Out of Place Do): when carrying out the activity the employee may lose sight of the risk points around him and may trip.</p> <p>Ergo.- Healthy postures or without excessive effort (Over Effort): when carrying out the activity, the employee may end up in uncomfortable postures.</p> <p>Lift truck / PIT-Equipment conditions: failure to perform the activity correctly may cause the lift truck to malfunction, which may cause injury to the employee.</p>

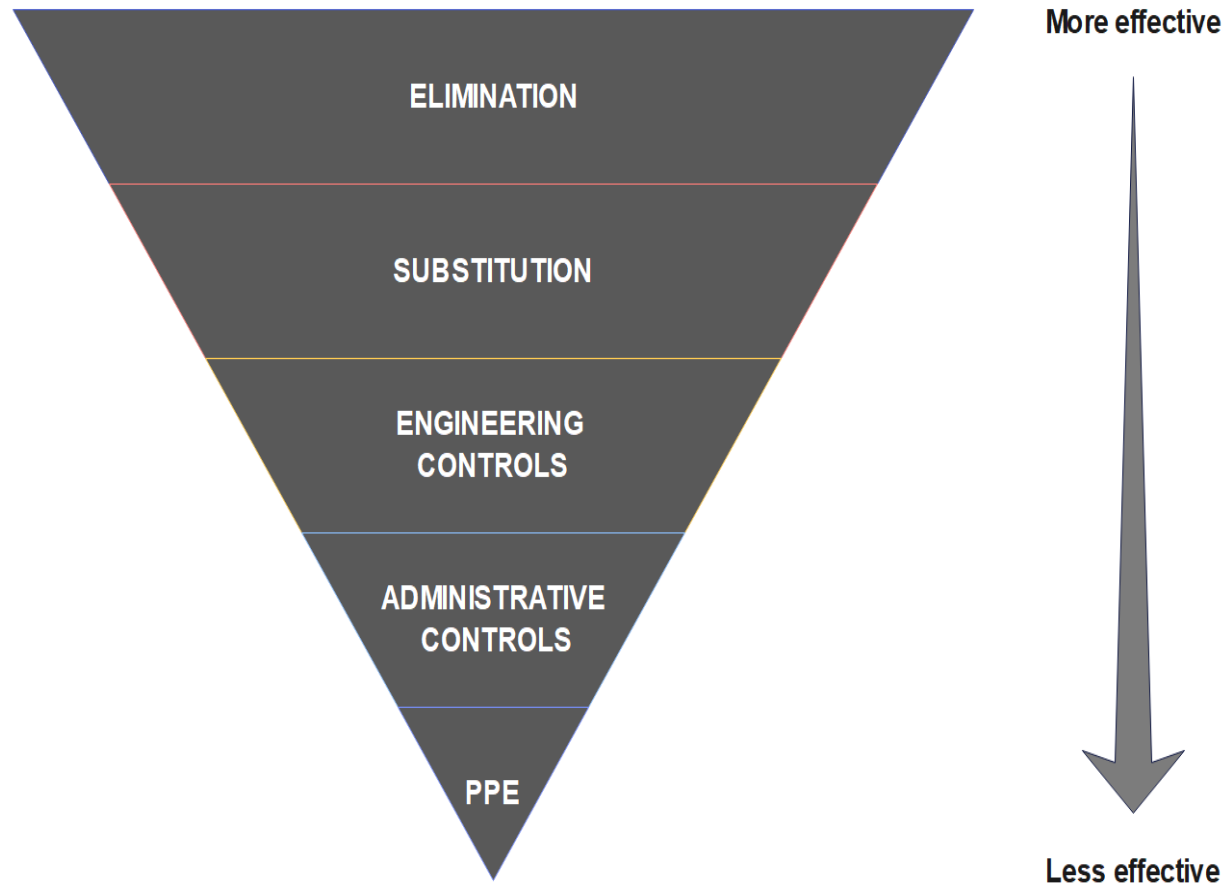
Num	Possible risk
3	<p>Human error, human behavior: not putting on a seat belt exposes the employee to injury.</p> <p>Ergo.- Healthy postures or without excessive effort (Over Effort): when carrying out the activity, the employee may end up in uncomfortable postures.</p>
4	<p>Mech .- Mass and speed (kinetic energy - uncontrolled movement): by not respecting the speed when the employee operates the lift truck, he or she may lose control of the unit and cause injury or death.</p> <p>Mech .- Impact: when operating the lift truck the employee may lose control of it and cause injury or death.</p> <p>Lift truck / PIT-Operating environment: Failure to consider the spaces available to operate the unit could cause injury or death to the employee.</p> <p>Lift truck / PIT-Mis-Operation: Operating the lift truck without prior training could result in injury or death to the employee.</p>



## Identifying the damage

Num	Damage
1	<ul style="list-style-type: none"> <li>• Entrapment of extremities of hands.</li> <li>• Trips/Falls/Slips.</li> <li>• Unhealthy postures.</li> <li>• Bruises, fractures, Interior, Death, installation or damage to equipment.</li> </ul>
2	<ul style="list-style-type: none"> <li>• Physical injuries.</li> <li>• Trips/Falls/Slips.</li> <li>• Unhealthy postures.</li> <li>• Bruises, fractures, Interior, Death, installation or damage to equipment.</li> </ul>
3	<ul style="list-style-type: none"> <li>• Physical injuries.</li> <li>• Unhealthy postures.</li> </ul>
4	<ul style="list-style-type: none"> <li>• Contusions, hematomas, fractures, death, damage to facilities or equipment.</li> </ul>

## Risk control hierarchy



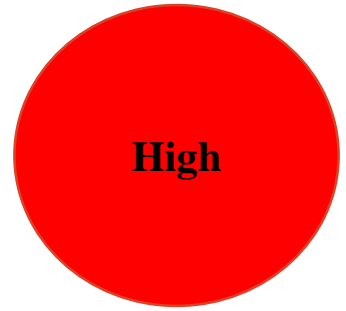
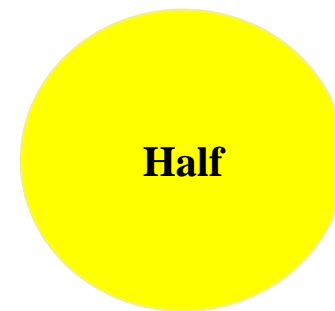
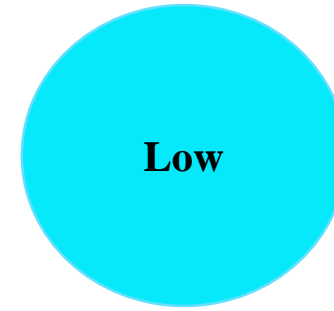
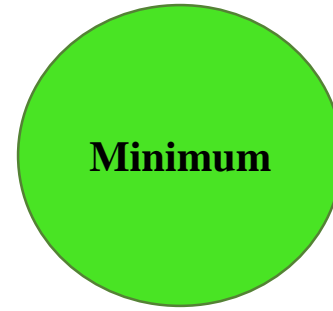
Num	Risk hierarchy
1	Administrative controls
2	Administrative controls
3	Administrative controls
4	Administrative controls

## Identification of current controls

Num	Current controls
1	Training for the operation of the lift truck.
2	Training for the operation of the lift truck.
3	Training for the operation of the lift truck.
4	Training for the operation of the lift truck.

## Risk assessment

		Severity					
		NM	First Aid	Waste of Time	Irreversible		
Frequency		1	3	6	10	Probability	
Monthly	1	1	3	6	10	1	Unlikely
Weekly	2	4	12	24	40	2	Possible
Diary	4	16	48	96	160	4	Likely
Hourly	6	36	108	216	360	6	True



Num	Severity	Frequency	Probability	RPN
1	3	4	2	24
2	1	4	2	8
3	1	4	1	4
4	10	4	4	160

## Implementation of actions

Num	Actions		
1	Half	Administrative controls	<ul style="list-style-type: none"> <li>Perform safety observations when the activity is carried out to reinforce risky behaviours.</li> <li>Staff training for ergonomics, 5's, order and cleanliness.</li> <li>Implement a checklist for the lift truck inspection.</li> </ul>
2	Low	Administrative controls	<ul style="list-style-type: none"> <li>Perform safety observations when the activity is carried out to reinforce risky behaviours.</li> <li>Implement a checklist for the lift truck inspection.</li> <li>Staff training for ergonomics, 5's, order and cleanliness.</li> </ul>
3	Minimum	Administrative controls	-
4	High	Administrative controls	<ul style="list-style-type: none"> <li>Perform safety observations when the activity is carried out to reinforce risky behaviours.</li> <li>Operator Certificate, Training.</li> <li>Feedback on the use of personal protective equipment</li> <li>Implement a checklist for the lift truck inspection.</li> </ul>

# CONCLUSIONS

The risks that were identified include:

Exceeding the speed of the vehicle

Not having the right order and cleanliness of the work area

Not making a check list in which the conditions in which the unit is located

Not placing the seat belt and not using the appropriate personal protective equipment

## REFERENCES

- Cervantes, R., & Hernández, A. (2023). Risk assessment for biomechanical overload in quinoa workers in Bolivia. *Asoc Esp Med Trab*, 189-197.
- Cortés, J. (2012). *Safety and Health at Work*. Madrid: Tébar.
- Etherton, J. R. (2003). Empowering Effective Teamwork for Machine Risk Reduction in the Workplace. *The American Society of Mechanical Engineers*, 1-6.
- Guisela, E., & Montalvo, M. (2019). Frequency of musculoskeletal disorders in workers at a refinery in Lima. *An Fac med*, 337-341.
- Hjorth, S. V. (2018). Risk assessment and reduction in field work. *Alteridades*, 73-84.
- Liberati, E., Farhad, M., & Dixo-Woods, M. (2018). Learning from high risk industries may not be straightforward: a qualitative study of the hierarchy of risk controls approach in healthcare. *International Journal for Quality in Health Care*, 39-43.
- Manuele, F. (2005). Risk Assessment & Hierarchies of Control. *Journal of the American Society of Safety Engineers*, 33-39.
- National Institute for Occupational Safety and Health, N. (August 13, 2024). CDC. Obtenido de CDC: <https://www.cdc.gov/niosh/hierarchy-of-controls/about/index.html>
- Open and Distance University of Mexico, U. (July 11, 2024). UnADM. Obtained from UnADM: [file:///C:/Users/aleja/Downloads/EVALUACIO%CC%81N%20DE%20RIESGO%20LABORAL%20\(2\).pdf](file:///C:/Users/aleja/Downloads/EVALUACIO%CC%81N%20DE%20RIESGO%20LABORAL%20(2).pdf)
- Occupational Health and Safety Assessment Series. (July 18, 2007). WordPress. Retrieved from WordPress: <https://manipulaciondealimentos.wordpress.com/wp-content/uploads/2010/11/ohsas-18001-2007.pdf>
- Secretary of Labor and Social Welfare, S. (18 de July de 2024). Government of Mexico. Obtained from Government of Mexico: <https://www.stps.gob.mx/gobmx/estadisticas/riesgos.htm>
- Secretary of Labor and Social Welfare, M. (2024, May 14). Self-management in Safety and Health at Work. Retrieved from Self-management in Safety and Health at Work: <https://asinom.stps.gob.mx/Centro/ConsultaNoms.aspx>



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