

Risk exposure of sprayer inspector during the inspection

- An ergonomic approach

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SPISE, 15 to 17 October 2014 – Montpellier, France



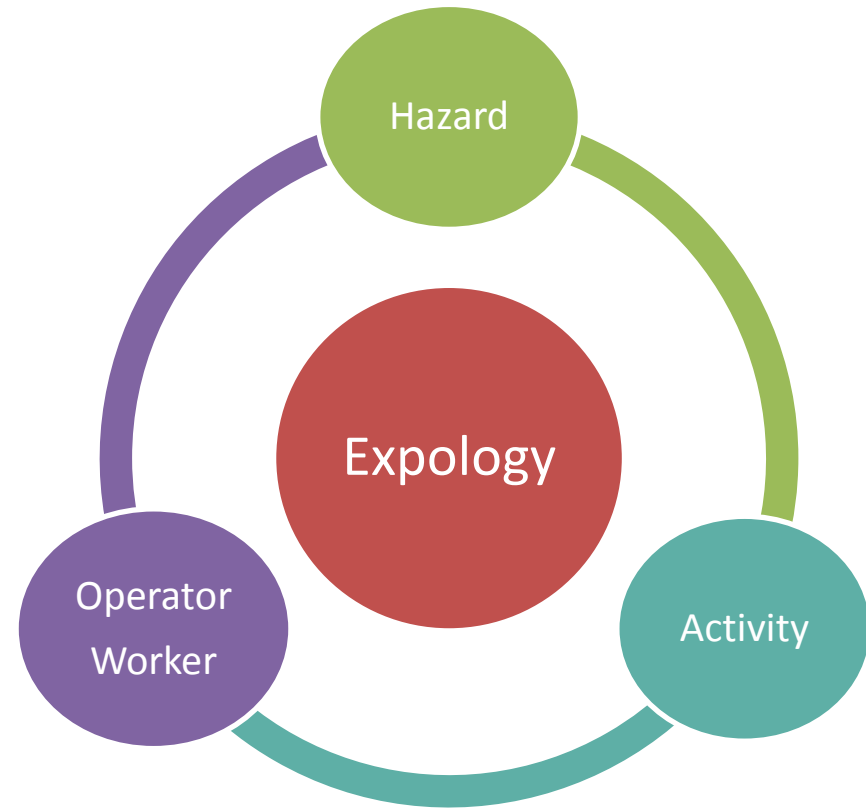
Risk = Hazard x Exposure

Population exposed to pesticides I

- Operator
- Worker

Mandatory sprayer inspection started in January 2009 in France.

New population Exposed :
sprayer inspection ?





Risk = Hazard x Exposure

The inspector should protect ?

Yes but with reasonable
protection?

Is this necessary ?





To introduce work practices to limit spray inspector's exposure.

Only an integrated approach that takes into consideration working, personal and spray equipment design, and information on best practice will have a long term effect.

It is suggested that a systematic ergonomics evaluation of sprayer interfaces with the view of reducing direct and indirect inspector contamination will inform sprayer manufacturers in the design of new equipment with safety in mind.

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Methodology

During the implementation process, it appeared necessary to conduct an ergonomic study in order to identify critical situations in terms of health and safety for the inspectors.

The methodology was based on videos of inspector practices.

- How many sprayers are checked ?
- Beginning : Discussion with the client
- Inspection
 - Nozzle inspection ...
 - Test
 - Handling sprayer
- Report
- End : Discussion with the client

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To introduce work practices to limit spray inspector's exposure.



Methodology

Activity analysis

Inspector's work during the whole spraying process in order to identify probable contact sites.

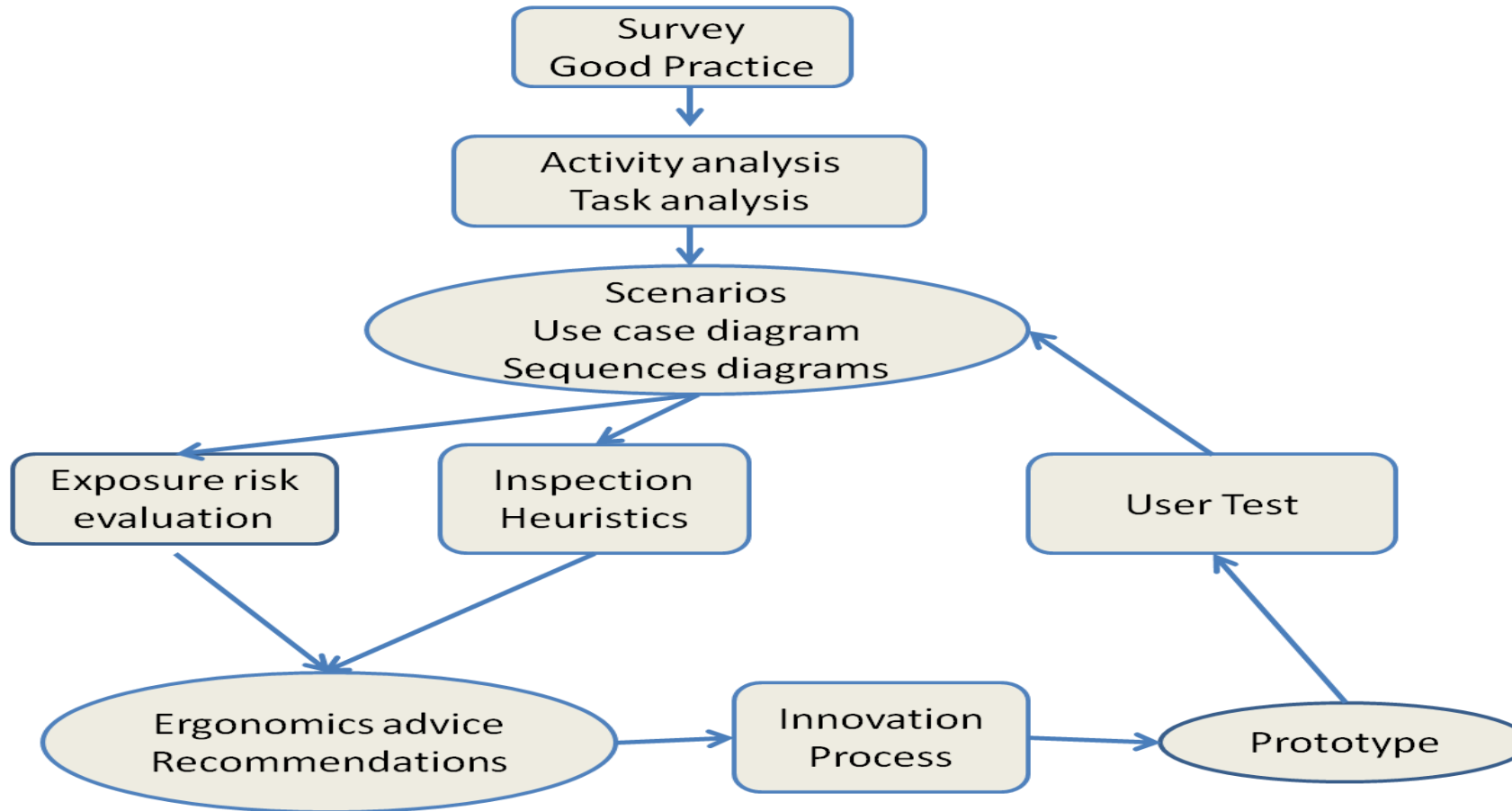
Ergonomics inspection

Sprayer interfaces that examines, under different criteria, the different parts of the sprayer that can come into contact with the inspector during the inspection.

Failure modes, effects and criticality analysis (FMECA)

Methodology

AN ACTIVITY ANALYSIS OF INSPECTOR'S WORK DURING THE WHOLE PROCESS



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Result

Systematic Inspection of each element of the sprayer using a fourway heuristic - e.g tank drain



- + accessibility --
- required force ---
- + visibility ----
- + exposure risk -----





Result

EXAMPLE

Failure modes analysis in terms of potential exposure to PPP. A criticality value for each element for different models of sprayer.

Element	Failure	Cause	Effect	Gravity	Frequency	Detection	Criticality
Tank drains	1) Drain Accessibility difficult.	1)The drain nut or tap is contaminated. 2) Visual and physical accessibility difficult .	Mix pours on Inspector when drain opened.	3	2	2	12



Failure modes, effects and criticality analysis (FMECA)

EXAMPLE

Potential contact points identified : 53 – 320 contacts with sprayer

Remove gloves : $\mu = 48$

Failure frequency	Criticality Level			
	Insignificant	Marginal	Critical	Catastrophic
Frequent		Reservoir cover	Hand rinse inspection	Writing report Nozzle inspection
Probable		Reservoir Guage		Filter,
Occasional		Pressure Guage		Pneumatic nozzle
Improbable	Electric control box			

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Conclusion

Chronicles of activities were defined and the work arrangement appeared to play a major role on the potential exposure of the inspector.

= Pilot Work

For example, sprayer inspectors usually have problems to manage their protective garments and especially their gloves that are successively weared and removed during the phases of sprayer testing (contact with the sprayer), the inspection in general and computer work.

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A deeper focus was then identified to decrease the risk of skin exposure in general and hand exposure in particular by adopting simple health and safety rules.



Perspectives

A number of challenges were identified in choosing suitable ergonomics evaluation criteria that could be implemented in a FMECA for a pesticide sprayer.

The risk evaluation technique has proved a useful complement to classical ergonomics evaluation techniques. Further work is planned to test other methods from accident analysis and risk evaluation practice.



Risk = Hazard x Exposure

The inspector should protect ?

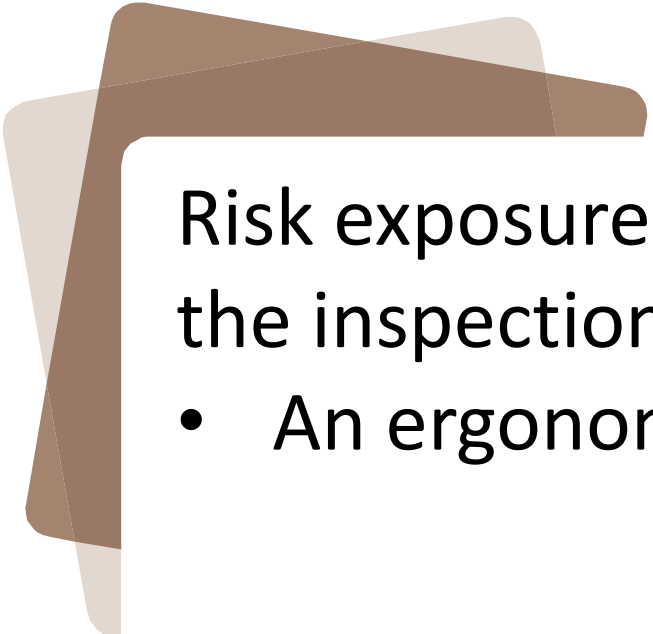
Yes but with reasonable protection?

No, it's not necessary



Gloves = YES





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Thanks :

- V. Polveche (GIP Pulvés)
- Inspectors

And JP ...

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