



Sprayer inspection parameters as a basis for risk assessment for human health and the environment

J. K. Wegener
Julius Kühn-Institute, Braunschweig, Germany

Initial Situation

§8 (3) of Sustainable Use Directive (Directive 2009/128/EC)

Member states may apply different timetables and inspection intervals to pesticide application equipment (PAE) ...

- not used for spraying pesticides,
- which are handheld application equipment,
- knapsack sprayers,
- or additional PAE that represents a very low scale of use.

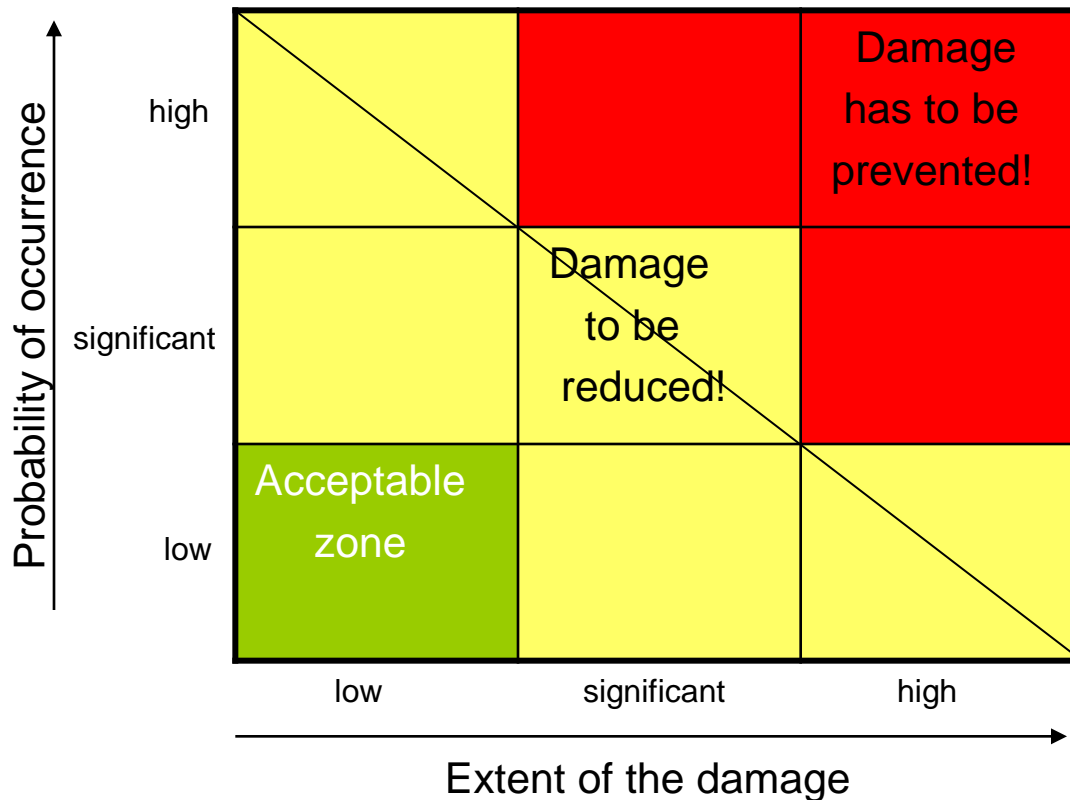
These exemptions have to be established based on a risk assessment.

Dr. Ganzelmeier presented a method for risk assessment on SPISE 4 based on the Zürich-methodology by Nohl & Thiemecke in order to convince the Member States of a comparable procedure which is scientifically based, transparent and which complies with current technical knowledge.

Zürich-methodology: How it works



A technical risk is the product of probability of occurrence and the extent of the subsequent damage.



2-dimensional matrix

- Probability of occurrence
- Extent of the damage

Aim is to define how high a risk might be

- Green: no risk reduction is necessary
- Yellow: risk reduction is necessary
- Red: risk reduction is urgently necessary

Calculating the extend of the damage on basis of sprayer inspection parameters

1. Step:

Qualitative analyses of equipment components being part of inspection (acc. EN 13790) and their impact on human health and environment combined with the classification scheme of relevant PAE.

Pesticide Appl. Equipment (PAE) Equipment components	spraying (incl. fogging)	hand-operated	not used for spraying	handheld	knapsack sprayers	additional	additional/train	additional/aircraft
Power transmission parts	++	+	0	--	--	0	+	+
Pump	+	+	+	0	0	0	+	+
Agitation	+	+	0	--	-	-	++	++
Spray liquid tank	++	+	+	--	--	+	++	++
Pipes and hoses	+	++	++	--	--	0	++	++
Spray boom	+	0	0	--	--	-	+	++
Filter	0	0	0	-	-	0	0	0
Nozzles	++	++	+	-	-	0	++	++
Controls	0	0	0	-	0	0	+	+
Regulation systems	+	0	0	-	-	+	++	++
Distribution / drift	+	0	0	-	0	0	++	++
Cleaning	++	0	0	-	-	0	++	++
Blowers	+	-	-	-	-	-	-	-
	205	165	150	45	60	125	215	230
	⑥	⑤	④	①	②	③	⑦	⑧

2. Step:

Quantification of the results using the following numbers:

very low	low	∅	high	very high
--	-	0	+	++
0	5	10	15	20

3. Step:

Ranking the extend of damage (1-8)

Extent of the damage →

Pesticide Appl. Equipment (PAE) Probability of occurrence - level -	① handheld	② knapsack sprayers	③ additional	④ not used for spraying	⑤ hand-operated	⑥ spraying (incl. fogging)	⑦ additional/train	⑧ additional/aircraft

Calculating the probability of occurrence



Problem:

No specific figures about the probability of occurrence are available on a national level.

Suggestion of Ganzelmeier:

Considering the amount of different PAE used in practice since this is proportional to the frequency of incidents.

Risk Matrix



Extent of the damage

Pesticide Appl. Equipment (PAE)		Extent of the damage							
		⑧ handheld	⑦ knapsack sprayers	⑥ additional	⑤ not used for spraying	④ hand-operated	③ spraying (incl. fogging)	② additional/train	① additional/aircraft
Probability of occurrence - level -	1 (1')	1	2	3	4	5	6	7	8
	2 (2')	2	3	4	5	6	7	8	9
	3 (5')	3	4	5	6	7	8	9	10
	4 (10')	4	5	6	7	8	9	10	11
	5 (20')	5	6	7	8	9	10	11	12
	6 (50')	6	7	8	9	10	11	12	13

 risk low (risk factor 1-4)
 risk significant (risk factor 5-6)
 risk high (risk factor 7-13)

Risk matrix



Extent of the damage \longrightarrow

Pesticide Appl. Equipment (PAE)	Extent of the damage \longrightarrow								
	① handheld	② knapsack sprayers	③ additional	④ not used for spraying	⑤ hand-operated	⑥ spraying (incl. fogging)	⑦ additional/train	⑧ additional/aircraft	
1 (1')	1	2	3	4	5	6	7	8	
2 (2')	Exempted from inspection if operators are trained (3b)		6	8	10	12	14	16	
3 (5')			9	12	15	18	21	24	
4 (10')			12	16	20	24	30	35	40
5 (20')			15	20	25	30	35	40	
6 (50')	6	12	Risk Tolerance = 12				42	48	

Risk tolerance = 12

Must be inspected (3a)

() number of PAE

Risk matrix



Extent of the damage \longrightarrow

Pesticide Appl. Equipment (PAE)		Extent of the damage \longrightarrow							
		① handheld	② knapsack sprayers	③ additional	④ not used for spraying	⑤ hand-operated	⑥ spraying (incl. fogging)	⑦ additional/train	⑧ additional/aircraft
Probability of occurrence - level -		①	②	③	④	⑤	⑥	⑦	⑧
1	(1')	1	2	3	4	5	6	7	8
2	(2')	2	4	6	8	10	12	14	16
3	(5')	3	6	9	12	15	18	21	24
4	(10')	4	8	12	16	20	24	28	32
5	(20')	5	10	15	20	25	30	35	40
6	(50')	6	12	18	24	30	36	42	48

Risk tolerance = 12

risk low (risk factor 1-6)
 risk significant (risk factor 7-12)
 risk high (risk factor 13-48)

Summary

The risk assessment can determine which type of the relevant pesticide application equipment has

- a low
- a significant and
- a high risk

with regard to human health and the environmental protection by just considering those parameters which can be influenced by inspection.

The necessity of an inspection depends on the risk tolerance line which defines the need for action. In this case the risk tolerance line is derived from SUD in order to achieve an equal treatment of all PAE on a qualitative basis.

Questions which needs to be discussed



- Is a simple qualitative and quantitative approach as shown sufficient to represent the impact on human health **and** the environment?
- Would a more sophisticated approach come up with other results concerning the ranking of PAE?
- Are the numbers used for probability of occurrence level (1', 2', 5', 10', 20' and 50') OK?
- Are there statistics or at least plausible estimations available about the numbers of relevant PAE on MS level?
- Is the presented derivation of the risk tolerance line being at the level of 12 comprehensible and is the argumentation acceptable?

**Thank you for
your attention!**




















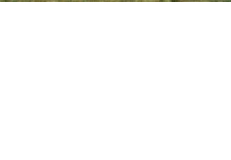







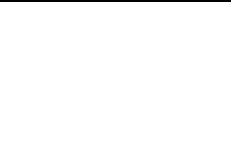






JKI

Julius Kühn-Institut

Bundeforschungsinstitut für Kulturpflanzen
Federal Research Centre for Cultivated Plants

Pesticide application equipment in professional use accord. article 8 FDW

<p>1) Pesticide Appl. Equipment (PAE)</p>				
<p>2) used for spraying incl. fogging</p>				
<p>3) & hand-operated PAE</p>				
<p>4) PAE not used for spraying pesticide</p>				
<p>5) PAE handheld &</p>				
<p>6) knapsack sprayers</p>				
<p>7) Additional PAE: (boom < 3m)</p>				
<p>8) Additional (train, aircraft boom > 3m)</p>				

Exempt from Inspection /3(b)

Different timetables, intervals, very low scale; acc. paragraph 3(a)

No low scale/3(a)