

# Identifying Occupational Health and Safety Risk Assessment Development Needs in Finnish Case Companies

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## ABSTRACT

Occupational health and safety (OHS) risk assessment is considered an important part of companies' safety management and the fulfilment of statutory obligations. In companies, however, it is not always known what kind of expertise and views the personnel have in relation to OHS risk assessment. In this study, the aim is to identify OHS risk assessment development needs using a questionnaire in three Finnish companies. The questionnaire was aimed at the entire personnel. The results ( $n = 348$ ) revealed a demand for OHS risk assessment needs development in terms of training and raising awareness, resourcing, and different types of communication, including discussions with employees about the results of risk assessments, progress measures, and the comparison of risk assessments at different locations. Future research should verify that the development targets identified through the questionnaire are relevant to companies.

**Keywords:** Risk assessment, Occupational health and safety, Risk assessment skill, Development, Improve

## INTRODUCTION

Risk assessment is an essential part of occupational safety management. The development of occupational health and safety (OHS) risk assessments at a workplace can reduce accidents at work and improve the health and safety of working conditions, improve the productivity and competitiveness of the workplace, and support workers' ability to work (Aldana 2001; Shearn 2003; Leitao et al. 2018). Moreover, legislation obliges an employer to ensure safe working conditions for its employees (23.8.2002/738 2002; 89/391/EEC 1989). On the basis of previous research, it is important to develop, inter alia, the necessary expertise and support for OHS risk assessment skills (Abu-dayyeh et al. 2006). Training is also needed with regard to existing methods, such as the use of risk matrices (Peace 2017). Huang et al. (2021) raised the importance of safety attitudes, awareness, and knowledge to avoid accidents resulting from, for example, carelessness or negligence in the use of protective equipment. On the other hand, this can be viewed from a different perspective. Some of the violations may be due to deficiencies in terms of instructions

or the equipment. Although workers strive to do their work efficiently and safely, they may not be able to follow the procedures (Reason 1998).

Furthermore, risk assessment is a multi-stage process that needs development in all its phases. If an incomplete or inaccurate result is obtained during one of the phases of the risk assessment process, it may lead to inappropriate results regarding the overall risk assessment (Pinto et al. 2013). When developing the risk assessment process, attention should be paid to its different phases. The risk assessment process is affected by many factors, such as hazard identification (Bahn 2013) and safety risk performance (Pandit et al. 2019), frequency, consequence and risk estimation (Arunraj and Maiti 2007), the composition of the risk assessment group, resources, and consultations with different stakeholders (Pinto et al. 2013). In addition, Backlund and Hannu (2002) considered the requirement specification, scope definition, and planning and documentation phases as important factors. The aim of this study is to identify the OHS risk assessment development needs in three Finnish companies.

## METHODS AND MATERIALS

The OHS risk assessment development needs were studied using a questionnaire designed as part of a larger project (Rantala et al. 2022). The questionnaire examines staff perceptions and their levels of competence related to OHS risk assessment. The questions are based on interviews, the Delphi survey technique, and a self-evaluation tool (Rantala et al. 2022) that was developed for assessing the success of OHS risk assessments. The main themes included in the questionnaire are as follows: 1) why risk assessment is carried out; 2) what experience the person has in carrying out risk assessment; 3) investment in risk assessment; and 4) how to further develop risk assessment.

The themes of the questionnaire were presented at the steering group meeting of the project, and the questions were designed according to the wishes of the steering group members. The questionnaire was piloted in the companies involved in the project. The 11 questions and 25–44 statements were presented in slightly different formats depending on each respondent's background (employee, supervisor, risk assessor, organization's responsible person, or employee within the OHS organization). Based on the answers ( $n = 25$ ), the questionnaire was finalized, and the questions and statements were formulated in such a way as to suit all the respondents, regardless of each respondent's background.

The final questionnaire (Appendix A, only the questions discussed in this paper) consists of 11 questions and 45 statements and was sent to 3 companies outside of the original project (Table 1), and 348 responses were received. The questionnaire was available in digital form via Lime Survey. Three companies were selected for the survey because they were interested in developing their OHS risk assessment. Almost all the companies had backgrounds involving organizational or management changes, and they were interested in obtaining a better understanding of the current state of OHS risk assessment.

**Table 1.** Background information on the companies.

Company	Industry	Number of employees	Number of respondents
Company A	Transport services	80	22
Company B	Industrial maintenance services	450	32
Company C	Public, educational, cultural services	5000	294

## RESULTS

### Why Risk Assessment Is Carried Out

Regarding the open question on why OHS risk assessment is carried out, 263 responses that focused on anticipating and identifying harmful elements and hazards and reducing the risks arising from them were received. The mention of anticipation in safety work included the anticipation of problems, the anticipation of risks, or preparation for different situations.

In one company, a comfortable and safe working environment was also acknowledged as part of improving occupational safety for employees, customers, and other stakeholders. In the context of ensuring the safety of one's workmates and outsiders, safe daycare and pre-school education for children, as well as the safety of pupils and personnel, were also mentioned.

A few respondents had not heard of risk assessment or felt that the results of such assessment did not lead to action. Some of the answers to the question about why OHS risk assessment is carried out were rather narrow, such as 'to avoid accidents,' 'in order to avoid the realization of risks,' and 'in order to know how to anticipate disruptive situations.' A few respondents considered the question more broadly and brought up the following legal obligation: 'Risk assessment is the systematic identification of hazards. The obligation to carry out a risk assessment comes from the Occupational Safety and Health Act. An identified risk is one that can be prepared for and managed.'

### What Experience the Person Has in Carrying Out Risk Assessment

Almost all the respondents felt that they recognized the risks associated with their own work. In addition, situations where risk assessment should be carried out were perceived to be fairly well identified. The respondents had also identified risk or risk factors in the risk assessment that had led to corrective actions. More than half of the respondents acknowledged that they did not know how to use their company's risk assessment form or tool and that they had not received adequate training. However, the risk assessment leaders mainly felt that they were conducting risk assessments fluently. One-third of the respondents were unaware of their roles and tasks in risk assessment, and the objectives of risk assessment and the responsibilities regarding risk assessment and management were perceived to be unclear.

The respondents' training needs were addressed with an open question. Overall, there was a desire for general training in risk assessment, reflected by comments such as 'I need information on the whole subject,' 'More training is never bad when you do not use the risk management program every day,' and

'Compact and visual.' The forms of training mentioned included remote and local training, practical training through workshops for the persons responsible, training based on examples, choosing the right protective equipment in different situations to avoid over- or under-protection, workplace and custom orientation training, increasing one's understanding of risks, and other training related to attitudes.

In their view, the respondents did not understand all the terminology and concepts used in OHS risk assessment. The understanding of terms and concepts was addressed by three questions in addition to the other knowledge-related questions. One-third of the respondents disagreed with the following statement: 'I understand what the different probabilities and consequences mean in the risk assessment.' Almost half of the respondents replied that they did not know how to determine the magnitude of risk or how to assess the significance of a risk.

Based on the answers, it would seem that the terms are more familiar in industrial work, where, as a rule, less than one-fifth of the respondents disagreed with the statements. More than half of the respondents working in a non-industrial environment disagreed with the following statements: 'I know how to determine the magnitude of risk' and 'I know how to assess the significance of the risk.'

### **Investment in Risk Assessment**

With regard to investment in OHS risk assessments, it emerged that almost all the respondents agreed that risk assessment would improve safety at work, that they would improve safety at work by taking part in risk assessments. Respondents felt it was important for workers, experts, and persons with decision-making powers to participate in risk assessment. As a general rule, participation in OHS risk assessments is considered important in the workplace, conducting OHS risk assessments is encouraged, and it is important for the respondents to feel that their participation in OHS risk assessments is valued.

However, half of the respondents were of the opinion that not enough time had been set aside to prepare for the risk assessment and that the necessary background materials were not provided for them to familiarize themselves with beforehand. In addition, their own risk assessment skills and training were considered insufficient, and a third of the respondents felt that the people participating in the risk assessment had not received enough OHS risk assessment-related training, which can be interpreted as low investment in the knowledge and experience of the persons participating in such risk assessment. Nevertheless, nearly 80% of the respondents considered that the risk assessment leader had the necessary skills and training to carry out and manage the OHS risk assessment.

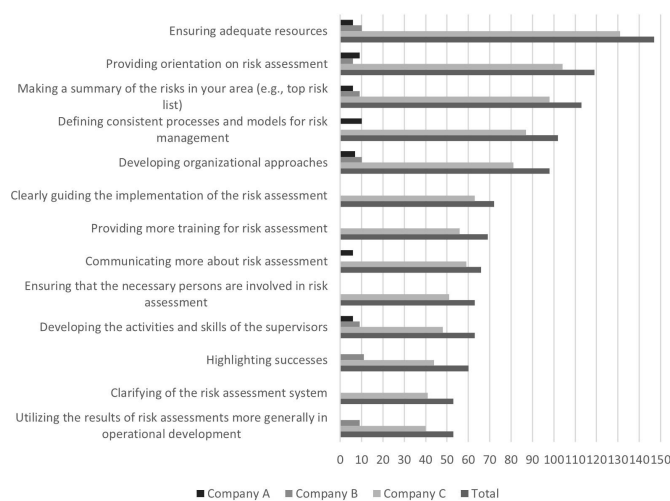
Half of the respondents acknowledged that the review of risk assessments in their organizations did not include a comparison of the risk assessments of different locations or entities. Furthermore, a third of the respondents felt that members from different stakeholder groups did not participate in the OHS risk assessment and that it was not monitored and reviewed regularly. There were also shortcomings in terms of communication as the results of the OHS

risk assessment were not reviewed with the employees, and progress regarding corrective measures was insufficiently communicated. A third of the respondents did not agree that representatives of different stakeholders (i.e., employees, experts, and people with decision-making power) participated in the OHS risk assessment.

However, the answers varied greatly due to the different industries of the companies. For example, nearly one-third of the respondents disagreed that residual risk assessment is part of the OHS risk assessment, as the practice of companies in terms of dealing with residual risks varies widely. In addition, in one company, one-third of the respondents were of the opinion that participation in risk assessment was not considered important in their company. In two other companies, the respondents either agreed or somewhat agreed that participation in risk assessment was considered important. There was also a company-specific difference in terms of encouraging and monitoring and reviewing OHS risk assessments. In one company, more than a third of the respondents disagreed with the above-mentioned statements, while the other two companies' respondents were somewhat in agreement.

### How to Further Develop Risk Assessment

The respondents were asked to choose up to five ways they would like to develop OHS risk assessment at their workplaces. Ensuring adequate resources was considered the most important way to develop OHS risk assessment. Next were chosen providing orientation on OHS risk assessment and summarizing the risks in one's area (e.g., a top risk list) and defining consistent processes and models for risk management and developing organizational approaches. Figure 1 shows deviations from company-specific responses. If the number of company replies is five or less, the total amount is taken into account, but the company-specific graph is missing. For example, company B raises the frequency of highlighting successes, which was not mentioned as often in companies A and C.



**Figure 1:** The deviations in the answers from companies A, B, and C and the total number of answers.

Moreover, the ways identified to improve OHS risk assessment skills varied between companies. Companies A and C preferred providing easy-to-use tools, whereas company B highlighted providing expert support. In addition, the respondents from companies B and C chose to provide orientation on risk assessment, but those from company A preferred to carry out risk assessment together with employees and experts and supervisors from different regions/sites/units. Clearly guiding the implementation of risk assessment and providing expert support were the next most popular ways to improve OHS risk assessment skills.

## DISCUSSION AND CONCLUSION

The results of the study show that the development of risk assessment should focus on training and raising awareness, resource management, communication and the comparison of risk assessments at different locations. The respondents considered it important to involve different stakeholders, but they felt that their risk assessments did not currently do so. Awareness can be enhanced by promoting communication and regular reviews of risk assessments and discussing the results of the same and the progress of corrective measures with workers. The methods proposed for the development of risk assessments varied widely between the companies, and the responses from the two smaller companies did not match those from the larger company. In terms of the method, a questionnaire was seen as the most applicable tool to easily gather opinions from three companies' personnel.

The results of this study are similar to those acquired through interviews (Lindholm et al. 2022; Rantala, Lindholm, and Tappura 2022). In a previous study, Bahn (2013) identified the need to train employees and managers and suggested regular training. Even when risk assessors are trained to use risk matrices, as Peace (2017) suggests, criticisms regarding their use still exist (Cox 2008; Ball and Watt 2013). Utilizing a risk register to prioritize the risks and count the key performance indicators (KPIs) throughout an organization enables top management to effectively monitor and provide feedback (Leva et al. 2017).

This study is limited by the small response percentage and the size difference between the companies. The response rate in one company was 28%, but in the other two, it was only slightly above 5%. An adequate response time was considered to be two weeks, so a reminder was sent at the beginning of the second week. One of the surveys was performed during the summer holiday season, which reduced the number of responses. In addition, the questionnaire's choice of words or, in other words, how the respondents understood the questions, the respondents' choice of words in relation to their open answers, and how the researchers interpreted and classified the answers might all have influenced the results. Further research is needed on whether the survey is suitable for all industries or if differences exist between different sectors. The applicability of the survey should be tested in companies of different sizes and outside of Finland. In addition, it should be verified that

the development targets identified through the questionnaire are relevant to such companies.

## APPENDIX A

<b>Respond to the statements</b> If the statement does not concern you, skip it. 1 = completely disagree with, 2 = somewhat disagree with, 3 = somewhat agree with, 4 = completely agree with, DK = don't know	1	2	3	4	DK
Risk assessment improves work safety	3	7	74	242	22
I improve the safety of my work by participating in risk assessments	10	19	87	149	83
Involvement in risk assessment is considered important at my workplace	21	45	109	99	74
It is important to me that my involvement in conducting the risk assessment is appreciated	10	27	91	119	101
I am aware of the objectives of the risk assessment	48	49	89	75	87
I have enough training and expertise to carry out risk assessment	42	85	68	55	98
Persons involved in risk assessment will receive training in risk assessment	31	57	72	26	162
I think that the risk assessment leader has the necessary skills and training to carry out and manage the risk assessment	11	25	86	53	173
The risk assessment team will be able to take into account psychosocial stress factors, physical, chemical and biological hazards, physical stress factors, and risk factors for accidents	15	36	92	46	159
I have enough time to prepare and participate in the risk assessment	55	71	55	28	139
Those involved in the risk assessment have sufficient time to prepare and participate in the risk assessment	33	64	59	20	172
The background materials required for the risk assessment are made available before the risk assessment event	31	52	53	21	191
I know my role and tasks in risk assessment	58	47	63	60	120
Responsibilities regarding risk assessment and management are clear	37	57	66	43	145

I consider it important that workers, experts, and decision-makers are involved in risk assessment	5	8	66	176	93
Our risk assessments involve different stakeholders (e.g., occupational health care, contractors, subcontractors)	24	40	49	42	193
As the risk assessment leader, I manage the risk assessment sessions fluently	9	16	47	23	253
Conducting risk assessments is encouraged	24	30	68	69	157
The results of the risk assessments are utilized in practice	23	38	73	51	163
Feedback is given on the risk assessments conducted	26	47	60	38	177
The results of the risk assessment are reviewed with the employees	39	53	63	46	147
Employees are communicated the promotion of the corrective actions determined in the risk assessments	34	50	64	38	162
I have identified hazards or harmful elements in the risk assessment	12	25	60	67	184
The hazards or harmful elements I have identified have led to corrective actions to improve the safety of the work	15	28	67	56	182
I am aware of the risks involved in my own work	3	23	107	138	77
I identify situations where risk assessment needs to be carried out	16	29	93	80	130
I know how to use my organization's risk assessment form/tool	60	48	58	44	138
The risk assessment is monitored and reviewed regularly	30	39	71	35	173
The review of risk assessments in our organization includes a comparison of the risk assessments of different locations/entities	28	44	47	21	208
Assessment of residual risk is also part of the risk assessment	16	33	40	36	223
I understand what different probabilities and consequences mean in risk assessment	27	30	75	56	160
I know how to determine the magnitude of risk	48	49	63	44	144
I know how to assess the significance of the risk	50	45	63	45	145



<b>If you feel that the training you have receive and your skills in performing a risk assessment are insufficient, what kind of training or orientation do you need?</b>
<b>If you feel that those involved in risk assessment have not received enough risk assessment training, what kind of additional training or orientation do you think they need?</b>
<b>If you feel that the risk assessment leader does not have sufficient skills and training to perform and lead the risk assessment, what kind of additional training or orientation would she/he need?</b>

<b>Choose up to five ways you would like to develop risk assessment at your workplace</b>		<b>Choose up to four ways to improve your risk assessment skills at your workplace</b>	
Utilizing the results of risk assessments more generally in operational development	53	Promoting safety discussion practices	49
Developing the activities and skills of the supervisors	63	Organizing training and coaching on risk assessment	75
Developing organizational approaches	98	Organizing training and coaching on safe ways to work	45
Developing a procedure to ensure that the risk assessment results are discussed with employees	31	Using the support provided by the insurance company	4
Developing a risk assessment form	30	Using mentor action (experienced–less experienced pairings)	28
Defining consistent processes and models for risk management	102	Clearly defining the risk matrix (explaining verbally what the likelihood and severity of the consequences means for different factors, such as physical and chemical factors)	31
Clearly guiding the implementation of the risk assessment	72	Determining responsibilities and roles	81
Providing orientation on risk assessment	119	Defining consistent processes and models for risk management	58

Clarifying the risk assessment system	53	Raising current themes (including sharing example cases)	64
Providing more training for risk assessment	69	Clearly guiding the implementation of the risk assessment	113
Making a summary of the risks in your area (e.g., top risk list)	113	Incorporating the results of risk assessments into everyday decision-making	45
Making risk assessment documentation more fluent	37	Providing orientation on risk assessment	126
Cross-checking risk assessments with another team	14	Conducting participatory risk assessment with employees, specialists, and supervisors from different departments	60
Carrying out more detailed risk assessments at different stages of the work	42	Conducting common risk audits (among various groups or areas)	29
Highlighting successes	60	Providing expert support	82
Preparing for risk assessment in advance	29	Providing easy-to-use tools	144
Ensuring adequate resources	147	Comparing conducted risk assessments with each other	15
Ensuring that the necessary persons are involved in risk assessment	63	Communicating about the various stages and relevance of the risk assessment and issues raised in the risk assessment	23
Comparing conducted risk assessments with each other	20		
Communicating more about risk assessment	66		

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## REFERENCES

23.8.2002/738. (2002). *Työturvallisuuslaki 23.8.2002/738 (Occupational Safety and Health Act 2002/783)*.

- 89/391/EEC. (1989). *Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of work.*
- Abudayyeh, O., Fredericks, T. K., Butt, S. E. and Shaar, A. (2006). An investigation of management's commitment to construction safety. *International Journal of Project Management*, 24, pp. 167–174.
- Aldana, S. G. (2001). Financial impact of health promotion programs: A comprehensive review of the literature. *American Journal of Health Promotion*, 15(5), pp. 296–320.
- Arunraj, N. S. and Maiti, J. (2007). Risk-based maintenance-Techniques and applications. *Journal of Hazardous Materials*, 142(3), pp. 653–661.
- Backlund, F. and Hannu, J. (2002). Can we make maintenance decisions on risk analysis results?. *Journal of Quality in Maintenance Engineering*, 8(1), pp. 77–91.
- Bahn, S. (2013). Workplace hazard identification and management: The case of an underground mining operation. *Safety Science*, 57, pp. 129–137.
- Ball, D. J. and Watt, J. (2013). Further Thoughts on the Utility of Risk Matrices. *Risk Analysis*, 33(11), pp. 2068–2078.
- Cox, A. L. (2008). What's wrong with risk matrices? *Risk Analysis*, 28(2), pp. 497–512.
- Huang, C. F., Tsai, Y. L. and Lu, W. H. (2021). Relationships among perceived control, safety attitude, and safety performance: a case study on wastewater treatment plant workers. *Sustainability (Switzerland)*, 13(22), pp. 1–18.
- Leitao, S., Mc Carthy, V. J. C. and Grener, B. A. (2018). Health and safety practitioners' health and wellbeing — The link with safety climate and job demand-control-support. *Accident Analysis and Prevention*, 119, pp. 131–137.
- Leva, M. C., Balfe, N., McAleer, B. and Rocke, M. (2017). Risk registers: Structuring data collection to develop risk intelligence. *Safety Science*, 100, pp. 143–156.
- Lindholm, M., Rantala, M. and Tappura, S. (2022). Development needs for risk assessment – A case study of five Finnish companies. In: 13th International Conference on Applied Human Factors and Ergonomics (AHFE 2022).
- Pandit, B., Albert, A., Patil, Y. and Al-Bayati, A. J. (2019). Impact of safety climate on hazard recognition and safety risk perception. *Safety Science*, 113, pp. 44–53.
- Peace, C. (2017). The risk matrix: Uncertain results?. *Policy and Practice in Health and Safety*, 15(2), pp. 131–144.
- Pinto, A., Ribeiro, R. A. and Nunes, I. L. (2013). Ensuring the quality of occupational safety risk assessment. *Risk Analysis*, 33(3), pp. 409–419.
- Rantala, M., Lindholm, M., Nenonen, N., Tappura, S. and Kivistö-Rahnasto, J. (2022). *Kuinka tukea riskienarviointiosaamista ja arvioida riskienarviointin onnistumista.* Tampere.
- Rantala, M., Lindholm, M. and Tappura, S. (2022). Supporting Occupational Health and Safety Risk Assessment Skills: A Case Study of Five Companies. *International Journal of Environmental Research and Public Health*, 19(3), p. 1720.
- Reason, J. (1998). Achieving a safe culture: Theory and practice. *Work & Stress*, 12(3), pp. 293–306.
- Shearn, P. (2003). *Case Examples: Business Benefits Arising From Health & Safety Interventions.* Broad Lane, Sheffield: Health and Safety Laboratory.