Standard Operating Procedure and Risk Assessment

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1. Introduction

Standard Operating Procedures (SOP) and Risk Assessments (RA) need to be carried out for all lab work and field work. SOPs provide clear instructions for the planned activity whereat the risk assessment allows to identify the potential hazards which can harm people or equipment. The protective measures identified in the risk assessment must be implemented before your work begins.

2. Standard Operating Procedures

The SOP describe your work, it is basically a summary and gives a short overview over your experiment. In case you have multiple elements in your stay, e.g. fieldwork on the boat, fieldwork on land, experimental work in the lab. It may be easiest to write one SOP for each of them. To see, what an SOP can look like, you can look at the template from Kings Bay.

3. Risk Assessment

Some general remarks concerning risk assessment:

The risk assessment builds the fundament of the HSE work. Risk assessment and risk analysis are often used in an interchangeable way. Part of a risk assessment is a hazard analysis and a risk evaluation. How the risk assessment looks like, depends on the application and aim. Prominent examples are the Failure Mode Effect Analysis (FMEA) or Fault tree analysis (FTA).

The aim of a risk assessment is to minimize the risk until it is acceptable. If a risk is acceptable depends on the consequences. Obviously deadly consequences are never acceptable, whether the loss of a part of an instrument might be acceptable.

A risk assessment is a great tool, which, used from the beginning of planned fieldwork, helps throughout the process to identify hazards. It helps to identify possible flaws, improve understanding and trigger improvements of the experiment/work process/instrument. Each time the process is altered or new knowledge ducks up, the risk assessment should be renewed, so that it is always mirrors the latest state of knowledge.

An important factor contributing to a good risk assessment is teamwork. It enhances the thought processes and makes sure, that the necessary knowledge is available. This means, that a successful risk assessment might need some time and involves colleagues from different work areas.

Which steps does a risk assessment involve?

- Risk Identification
- Risk Analysis
- Risk Evaluation
- Risk Control

In the attachment you find a template outlining the different steps and giving you an example of how a risk assessment can look like.

How do I do a proper Risk Assessment? Some tips.

- Use the knowledge of your colleagues and plan in the time to evaluate all potential risks.
- As said, more than one person is involved in the risk assessment. But to avoid they influence each other; they should conduct the risk evaluation independently from each other. That means, person A going through the risk analysis/evaluation should not see, which risk analysis/evaluation person B has done. This is especially important for qualitative risk analysis and evaluation.
- It is important to keep in mind, that failures on one level can trigger failures on another level. For example, while the direct result of a failure has little consequence and thus an acceptable risk, the indirect results may lead to high risks. In addition, some failures/condition may in combination lead to higher risks, e.g. in case of a boat bad weather+ sea ice + motor failure has another consequence, than just one of each hazard. But we should be aware not to look at too many combinations/levels/topics at the same time, as otherwise the risk assessment can get very confusing and time consuming. Plan, before you begin!

- To do a risk assessment the first time is very complex and time consuming. But you can use the results of earlier risk assessment and/or available knowledge, e.g. material safety data sheets for chemicals. But it is important to make sure, that earlier results of the risk assessment were done under the same assumptions, e.g. the hazard for an experiment may differ doing the same experiments in the tropics from doing it in the arctic.
- It is probably impossible to map all possibilities for human error, but you should profit from the experience of your colleagues and include measurements minimizing the effects of human error.
- It helps to separate a process into subprocesses and see how you would avoid getting unwanted results in your process. In the same way, if you would write a risk assessment for a prototype, you would break down the instrument into submodules.

What does your risk assessment need to encompass?

What topics/situations/levels must be in a risk assessment is depending on the focus. A risk assessment about boat operations will look at other factors, than a risk assessment looking at a new method used in a chemical laboratory. The following list gives you some ideas, of what you can look at:

- Environmental pollution,
- Hazardous Substances,
- Animals dying,
- Frost bite,
- Rapid Changing Weather,
- Work in fume hood.

Special Case: Chemicals used

In case of the use of chemicals the Norwegian Law has a detailed list over which points have to be included in a risk assessment. To read the Norwegian original: *Forskrift om utførelse av arbeid, bruk av arbeidsutstyr og tilhørende tekniske krav (forskrift om utførelse av arbeid) – Kapittel 3 Arbeid hvor kjemikalier kan utgjøre en fare for arbeidstakerens sikkerhet og helse - §3-1. Risikovurdering av helsefare ved bruk og håndtering av kjemikalier. (Regulation about the execution of work, use of working equipment and connected technical requirements (regulation about the execution of work) - Chapter 3 Work where chemicals may pose a danger to the employee's safety and health - §3-1. Risk assessment of health hazards when using and handling chemicals.)*

According to the law, the risk assessment shall pay attention to:

- The dangerous characteristics of the chemicals,
- Safety Data Sheet and other HSE information from the supplier (e.g. Merck, Roth…),
- Workplace the chemicals will be used (e.g. fume hood, …),
- Amount and way of use of the chemical,
- Are the work process and work equipment appropriate?
- Number of employees which may be exposed,
- Type, duration, level, frequency and way of exposure,
- Thresholds,

- Effect of implemented and planned preventive measures,
- Conclusions of completed health examinations,
- Injuries, illnesses, accidents at work and approaches to such accidents.

What is Kings Bay expecting to be part of the Risk Assessment?

- It is important, that the risk analysis was not done by only one person.
- You should mark your risk analysis with:
    - Date when you went through it the last time.
    - Name of persons, who performed the risk analysis (at least two)
- The risk assessment should include all field work or lab work specific potential harms.

Attachments

Template Risk Assessment - Excel

Template SOP - Word

For further information

- § 3-1. Risikovurdering av helsefare ved bruk og håndtering av kjemikalier (arbeidstilsynet.no)
  (Law only in Norwegian)