DOPAS
Training Workshop 2015

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Risk management for large-scale experiments and work underground

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Scope of this lecture

- **The process of risk management (PMBOK Guide®)**

  Planning - Identification – Assessment – Response development – Control

- **Practicalities related to risk management**

- **Special features of risk management of large-scale experiments and underground work**

Why care about risks?

- **Ensure to follow legal requirements**
- **Avoid people getting injured**
- **Protect the environment**
- **Control of costs**
- **Keep confidence in the project**
- **Trust in the business (a company threat)**
- **Use lessons learned**
  (making the same mistakes again and again is insanity..).

What is a project risk?

1. **Cumulative effect of the probability of uncertain occurrences that may positively or negatively affect project objectives.**

2. **Degree of exposure to negative events and their probable consequences (opposite of opportunity). Characterized by three factors: risk event, risk probability, and amount at stake.**

Ref. Project Management Terms. by J. LeRoy Ward

Five Risk Management processes

1. **Planning**
2. **Identification**
3. **Analysis and assessment of risks**
4. **Risk response development**
5. **Control and follow-up**

1. Planning (according to SKB)

- **Risk analysis is initiated in the early project planning, as soon as the scope of the project has been defined.**
- **Risks must be continuously reviewed during a project.**
- **Before start of work-activities in the field (underground) a detailed risk analysis must be performed and documented. The basis for this analysis is the work plans.**
- **Involve different professional categories when the risk analysis is carried out.**
- **Clarify responsibilities for the work.**
- **Pre-job brief (where contractors participate)!**

2. Identification of risks

- **Where do we start? How is it done?**

q **Review the project plan**

q **Review the defined scope statement (WBS)**

q **Use a checklist (if available)**

Riskidentifiering

I de fall någon av nedanstående inträffar (Ja) klassas dessa som risker o analysen tillsammans med andra delar som kan vara kritiska i förhållan miljö.

Arbete som kan vara kritiska ur arbetsmiljösynpunkt	Ja	Nej
Arbeten från stege eller plattform		
Uppkomst av buller (från exempelvis maskiner, borrmaskiner eller liknande)		
Uppkomst av damm (från exempelvis bentonithantering, material innehållande kvarts etcetera)		
Uppkomst av lukt (från exempelvis färg, lacker, bensin eller liknande)		
Uppkomst av vibrationer (från exempelvis arbetsredskap eller maskiner)		
Kräver arbetet trafikljus eller övrigt varningsljus (exempelvis arbete i rampen TASA)		
Utsläpp till luft		
Arbeten med särskilda tillstånd	**Ja**	**Nej**
Heta arbeten (exempelvis kapning med vinkelslip, svetsning, skärning, lödning och		

Arbete som kan var miljösynpunkt
Uppkomst av förpac
Utsläpp till vatten (a exempelvis kärn- och
Uppkomst av avfall s som kräver särskilt ti större mängder bento
Uppkomst av annat f exempelvis brännbar
Uppkomst av farliga exempelvis färgburk oljeavfall och likand
Uppkomst av gaser (nitrogen, svetsgaser, liknande)
Användning av kem
Användning av kemi exempelvis aerosoler

- **The identified risks are documented in a separate "risk register" which will also include the triggers that indicate the occurrence of the event that took place.**

- **Categorize risks for better focus.**

3. Analysis and assessment of risks

- **Prioritize risks for further analysis or action by assessing and combining the <u>probability</u> of occurrence of the risk and its <u>impact</u>.**
- **Use a pre-defined template, example from SKB:**

<u>Prabability and Impact Matrix</u>

R = S x K *(Risktal = Sannolikhetsklass x konsekvensklass).*

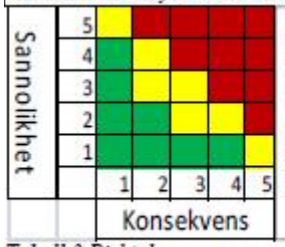
Sannolikheten för att risken ska inträffa
5 50 - 100 %
4 25 - 50 %
3 10 - 25 %
2 1 - 10 %
1 0,1-1 %

Tabell 1 Sannolikhet

Konsekvensen av skadan
5 Dödsfall
4 Invalidisering
3 Bestående skador
2 Skada övergående
1 Mindre skada

Tabell 2 Konsekvens

Risktal = Sannolikhet * Konsekvens
Risktal 10 - 25 betyder att risken bedöms vara hög
Risktal 5 - 9 betyder att risken bedöms vara medel
Risktal 1 - 4 betyder att risken bedöms vara låg



Riskbedömningen är gjord i skala 1-5, där 1 är det lägsta och 5 är det högsta värdet. Beräkna riskernas prioritetsklass vilken bestäms av Riskvärdet.

Riskvärdet styr prioritetsklassen enligt ovan tabell och illustreras i riskmatrisen där prioritetsklass återges i rött, gult och grönt.

Tabell 3 Risktal

- **The risk register can be used for further quantitative analysis such as economic uncertainty of project budget.**

4. Risk response development

- **A risk that has been assessed as ”High risk” or ”Medium risk” shall always have a response action!**
  - **Avoid**
  - **Transfer**
  - **Mitigate**
  - **Accept (actively/passively)**
- **A risk that has been assessed as ”Low risk” needs no response action but remains in the risk register for control.**
- **Responsibility for each risk response is delegated, including a time plan to allow follow-up.**

5. Control and follow-up of risks

- **Use the risk register in project meetings, for communication with stakeholders and status reporting.**
- **The Project Manager (or delegated work responsible person) should always include in the project meeting agenda the task of re-evaluation of the prioritized risks.**
- **Some risks perhaps need to be handled on a company level.**
- **Close the risk when the work package is completed.**
- **Don’t forget to identify new risks!**

General concerns for work underground

- **Falling stones**
- **Fire (smoke)**
- **Evacuation of staff**
- **Logistics**
- **Narrow spaces (loss of breathing air)**
- **Falling (trap doors, holes, uneven/slippery floor)**
- **Lifting and transporting heavy items**
- **Lack of visibility**
- **Foreign materials (effect of chemicals etc.)**

Special risk features for large-scale experiments underground

- **Important to have knowledge about the site and experimental conditions:**
  - **Groundwater inflows and its chemical composition**
  - **Fractures in the rock**
  - **Geodetic measurements**
- **High water pressure conditions**
- **Challenges in logistics (installations, transports, timing)**
- **Management of primary data from sensors**

Case example of POPLU

- **Presentation by Mr. Petri Koho**

Group exercise (no 5) on Risk Management

- **Identifying and prioritizing risks for full-scale experiments**
  - **G1: DOMPLU**
  - **G2: POPLU**

- **Instructions:**
  - **Practice step 2 “Identification” and Step 3 “Assessment”**
  - **Focus on risks during installation of the full-scale test**
  - **No need to identify “administrative risks” such as purchasing, contracting or lack of resources.**
  - **Check DOMPLU and POPLU presentations for information about project objectives and technical installations.**

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Thank you!

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