Report template & Pre-study report

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https://www.ntnu.edu/ross/rams/tips-students

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Pre-study report

Your planning process

Pre-study report

- A good start of your project!

- Helps you to define – in your own words and in more detail – what you are going to do, how and when.

- Should be completed within first two weeks:
  - Draft within one week – circulated and discussed with your supervisor(s)
  - Final within two weeks

Pre-study report – Proposed content

- Problem definition and background
- Objective of project & tasks
- Limitations
- Research approach:
  - Actors involved in the project (and how)
  - Literature study
  - Tools and methods
- Table of content/structure of report
- Project risk register
- Temporary list of references
- Project execution plan (Gant or table excel/word)

Possible structure to use

Parts are also relevant for thesis later

Example

NTNU

Pre-Study Report

TPK4550 - Specialization Project

Condition Monitoring in Operation and Maintenance of Subsea Production Systems

Student Technician
Department of Production and Quality Engineering

Andreas Marhaug

Fall 2014

Approx 5+ pages

Table of Contents

Instead of CTR-sheets, you may add a bit more text about what you plan to do under each task in e.g. section 3 above.

3 Problem description

The problem that shall be addressed is formulated as collaboration between the teaching supervisor representing NTNU, Per Schjølberg; the industry supervisors representing A/S Norske Shell, Jan André Furnes and Terje Melby Hansen; and the student technician that is carrying out the specialization project, Andreas Marhaug.

The following five tasks are to be answered in the report. As the project proceeds, a need for clearer specification of some tasks may arise; based on such a need minor rephrasing of the problem description could take place.

1. **Discuss condition monitoring as a part of ISO 55000 - Asset Management**
   a. Present a generic description/summary of ISO 55000
   b. Present a discussion of condition monitoring as a part of ISO 55000
2. **Discuss the importance of condition monitoring for subsea production systems**
   a. Present a generic description and sketch of a subsea production system
   b. Present challenges related to operation and maintenance of subsea production systems
   c. Discuss how condition monitoring can contribute in overcoming stated challenges
3. **Present technologies for condition monitoring, for typical components of a subsea production system**
   a. Present description of typical components of a subsea production system
   b. Present technologies for condition monitoring of subsea production systems
4. **Asses accuracy in estimated maintenance requirements for the Ormen Lange gas field**
   a. Present a description and concept sketch of the Ormen Lange gas field
   b. Describe operator´s approach to determining the required maintenance
   c. Asses estimated maintenance requirements vs. actual maintenance requirements
   d. Identify potential areas of improvement
5. **Sketch a maintenance strategy focused on condition monitoring, for a subsea production system**
   a. Present a generic description of a maintenance strategy
   b. Sketch a maintenance strategy focused on condition monitoring, for a subsea production system

8 Initial risk register

Some factors that could impose a risk towards to time-schedule of the project and/or the quality of the results have been identified. The risk associated with each of the factors has been assessed qualitatively; mitigating actions have been recommended; and a guesstimate of the residual risk has been made. The result of this process is presented in Table 1.

TABLE 1 INITIAL RISK REGISTER

Index	Description	Cause	Consequence towards	Initial risk	Recommended actions	Residual risk
A	Fail to acquire sufficient theoretical frame of reference	Bad search techniques Full-text not available	Quality	High	Proactive mining of papers from day one Consult library personnel	Medium
B	Lack of critical feedback on project content and structure	No group members to offer different views and opinions	Quality	High	Continuous involvement of supervisors (NTNU and Shell)	Medium
C	No shared interpretation of the project goal and problem description	Bad communication	Quality	Medium	At an early meeting: discuss each party's expectations What is each party's contribution to the other?	Low
D	To little available time to work on project	Demands raised by other courses	Time Quality	High	Consider issue in planning Expect long hours	Medium
E	Insufficient involvement form Shell	Shell resource restrictions	Quality	Medium	Raise the concern to Shell Agree upon both	Low

9 Temporary list of references

The following sub-chapters provide a limited selection of initial sources of information used to familiarize with the subject prior to project initiation.

9.1 Books

Wilson, D. A., 2002. Asset Maintenance Management. New York, Industrial Press Inc.

9.2 Compendiums

UiT, 2012. Operations and maintenance. Tromsø, unpublished.

9.3 Standards

International Organization for Standardization, 2014. ISO 55000:2014 Asset Management. International Organization for Standardization.

9.4 Papers

Shreve, D. H., 2003. Integrated condition monitoring technologies. IRD LCC.

Eriksson, K., 2011. Control system and condition monitoring for a subsea gas compressor pilot. Sage Publications.

Eriksson, K., Antonakoupolos, K., 2014. Subsea processing systems: Optimizing the maintenance, maximizing the production. Proceedings of the Annual Offshore Technology Conference.

9.5 Additional

University lectures on condition monitoring

University lectures on subsea production systems

Nonacademic articles on the subject of condition monitoring technologies and implementation

Nonacademic articles on the subject of subsea production systems

Identify everything about what you have at hand

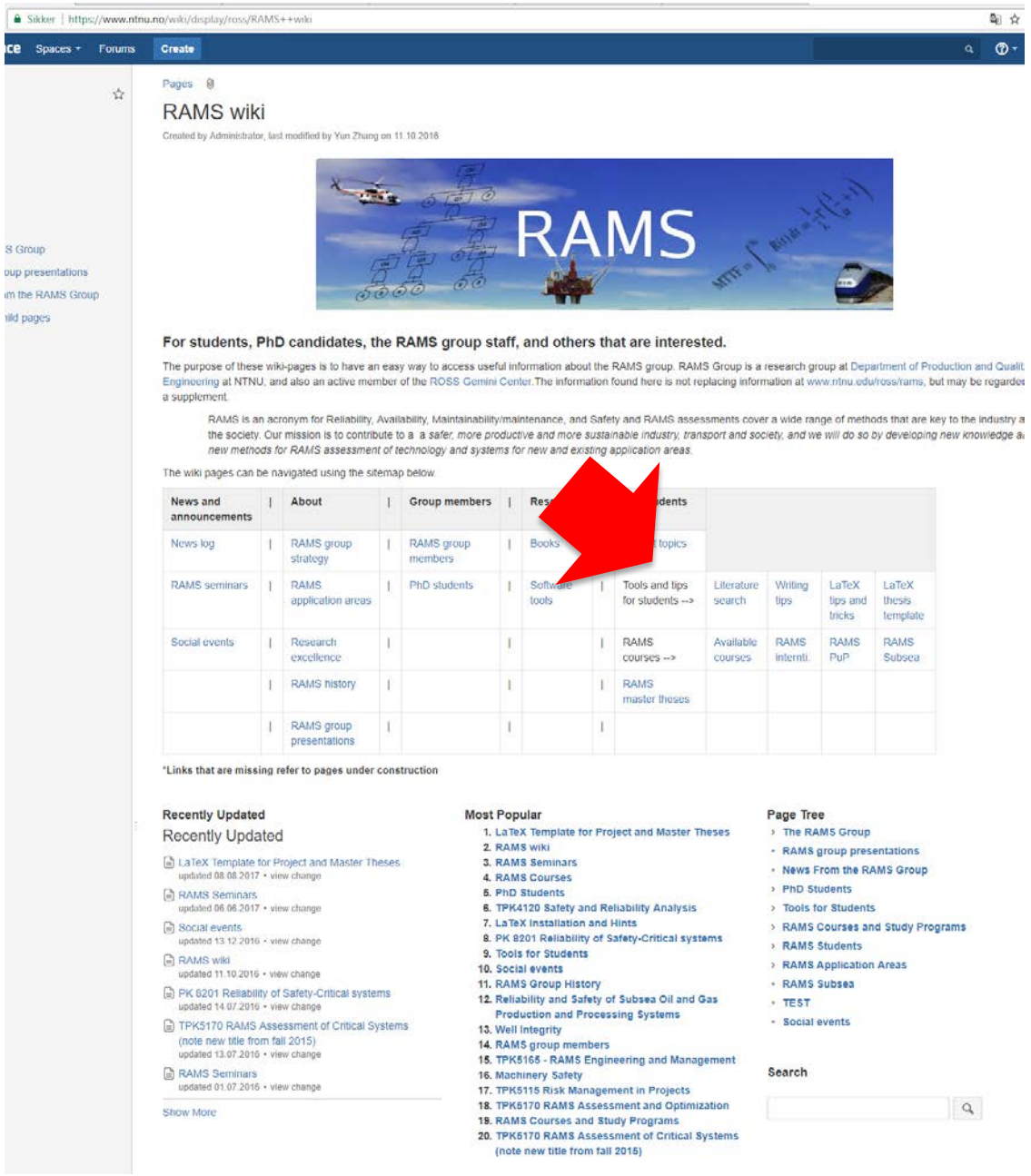
Report template

Specialization (and master thesis) report

Template proposal and tips

- Template and more:
  - https://www.ntnu.edu/ross/rams/tips-students
- Word or latex – your choice
- Tips in particular for Latex users:
  - https://www.ntnu.no/wiki/display/ross/RAMS++wiki (see illustration to the right)
- Language – (English or Norwegian): Decide together with your supervisor
- **Proposal:** Not longer than 60 pages…

«Elegance is when nothing can be removed»



Structure of report

"Fixed" structure, advices included

Chapters organized according to your topic

Contents

Structure of report

"Fixed" structure, advices included

Chapters organized according to your topic

Contents

Introduction

Problem formulation:

- What is your problem, why important and to whom.

Related work:

- Condensed presentation of what has been done in the area, with reference to books, papers, reports..

What remains to be done:

- Justifying in more detail what type of new knowledge that is needed, *in light of your problem*

Introduction

Objectives:

- You cannot close all knowledge gaps…

- You identify the objectives of what you are to do.
- It may be split into an high level objective, and more detailed sub-objectives.
- Sub-objectives, may also be regarded as tasks.

Introduction

This is the section where you explain HOW.

- How to meet objectives
  - Where to find literature? How to find?
  - Who to collaborate with?
  - What experiments to carry out
  - How to validate your results
- You may give the “HOW” for each sub-objective or task

Introduction

Here, you give an overview of the main intended contributions (“results”) in your work.

(This may be updated and iterated as the work goes on)

Conclusions

A summary of your work and the main results (what you have found).

- You may give comment to whether or not you achieved each objective/tasks
- If you have not met an objective, explain why

Conclusions

A high level discussion about your results:

- Strengths
- Weaknesses
- Limitations (in what you have done, the way that the results can be utilized)
- Opportunities (possible relevance of what you have done for other areas)

Put your work in a larger context!

Conclusions

Having worked so long on a topic, you can have ideas of possible extensions!

- Short-term
- Long-term

If you are writing specialization project:

- What could be relevant for you to continue with in the master project?

If you are writing master thesis:

- What could have been new topics for others to continue with?

Bibliography

- Put a lot of effort into the bibliography
- TIPS: Look into books by Marvin Rausand. Those bibliographies are normally close to "perfect"
- **Use few "templates"** for references: Book (cover textbooks, reports, standards,..), journal paper, and "in book"/"part of book" for conference papers

Book

Jensen, K. & Kristensen, L. M. (2009). *Coloured Petri Nets: Modelling and Validation of Concurrent Systems*. Heidelberg, Germany: Springer.

Journal paper

Jin, H., Lundteigen, M. A., & Rausand, M. (2011). Reliability performance of safety instrumented systems: A common approach for both low- and high-demand mode of operation. *Reliability Engineering and System Safety*, *96*(3), 365 – 373.

Jin, H., Lundteigen, M. A., & Rausand, M. (2012). Uncertainty assessment of reliability estimates for safety-instrumented systems. *Proceedings of the Institution of Mechanical Engineers, Part O: Journal of Risk and Reliability*, *226*(6), 646–655.

Jin, H., Lundteigen, M. A., & Rausand, M. (2013). New PFH-formulas for k-out-of-n:F-systems. *Reliability Engineering and System Safety*, *111*(0), 112–118.

Jin, H. & Rausand, M. (2014). Reliability of safety-instrumented systems subject to partial testing and common-cause failures. *Reliability Engineering and System Safety*, *121*(0), 146–151.

Conference paper

Johansen, I. L. & Rausand, M. (2011). Complexity in risk assessment of sociotechnical systems. In *11th International Probabilistic Safety Assessment and Management Conference and the Annual Europen Safety and Reliability Conference* (pp. 2274–2283). Helsinki, Finland: Curran Associates.

Report/handbook

OREDA (2009). *OREDA Reliability Data* (5th ed.). Available from: Det Norske Veritas, NO 1322 Høvik, Norway: OREDA Participants.

Standard

IEC 62061 (2005). *Safety of Machinery – Functional Safety of Safety-related Electrical, Electronic and Programmable Electronic Control Systems*. Geneva: International Electrotechnical Commission.

Citations

- Two types:
  Explicit and implicit
- Typical rules:
  - One author: Last name + year
  - Two authors: Last name of both + year (as shown above)
  - More than two authors: Only first authors last name + et al. + year

- As an *explicit* reference: It is shown by Lundteigen and Rausand (2008) and partly also by Rausand (2014) that ....
- As an *implicit* reference: It is shown (e.g., see Rausand and Høyland, 2004, Chap. 4) that ....

The international standard *Functional safety of electrical/electronic/programmable electronic safety-related systems* (IEC 61508, 2010) is a generic, performance-based standard for safety-related systems that involve E/E/PE technology. IEC 61508 pro-

► ***Remark***: The safety life cycle activities must be integrated into the normal product or system development model used by the company; otherwise, it risks being an add-on with limited influence on the main decisions that are made related to the SIS. Ideas on how to integrate reliability thinking and methods into the product development project are given by Murthy et al. (2008) and Lundteigen et al. (2009). ⊕

Plagiarism

An act or instance of using or closely imitating the language and thoughts of another author without authorization and the representation of that author's work as one's own, as by not crediting the original author (dictionary.com)

- Give proper references to sources that you use. NB: The reference should not be a reference that has used another reference as…. (i.e. go to the original work)
- If copying a sentence (or a few sentences): Use "Birnbaum's measure of …" followed by reference (e.g. (Rausand and Høyland, 2004)).

That is all… (?)

- Questions?