NTNU
Norwegian University of Science and Technology

Preliminary Report

TPK4500- Specialization Project

Department of Production and Quality Engineering

"Application of Root-Cause Analysis as an Early Warning System"

Submitted by:

Ghanizadeh Poshtekooh, Nasim

MSc. in Project Management

Supervisor: Bjørn Andersen

September 2013

Background

In order for projects to achieve success, they need to start well. Initiation processes are necessary to ensure that the project will be successful in future. Also, Because of the rapid changes in the environment, ever-quicker implementation is in demand. In environments like this there is no room for failure. Managers are seeking ways which help them in implementing projects in a shorter time, and reducing the risk of delay in projects. This means project management needs new tools in project management which are more suitable than traditional ways. Traditional tools are not a fit for today changeable environment anymore.

According to Ansoff, considerable surprises will not appear suddenly, there are some "weak signals" and symptoms of issues which appear much earlier than the issues themselves. In 1975 Igor Ansoff mentioned this theory of weak signals. He claims that weak and small signals in each project will become bigger and stronger if preventing actions are not conducted. This indicates the importance of forecasting future and anticipating weak signals early enough. Decision making and implementing preventive actions take time, it shows the importance of recognizing signals as soon as possible.

In Nikander(2002) literature of project management it is mentioned that some approaches which are recognized as the sources of early warning are risk analysis, stakeholder analysis, performance measurement and so on. One more tool which is indirectly related to this topic and can be investigated is the root-cause analysis approach. Root- cause Analysis is used to find out what has happened, why it happened and how to prevent them from happening again. In another word, according to Root-cause analysis, the root cause of current problems is found and is used to not let the problem happen again in the future. Finding a reason for a problem is not an easy task because usually a problem has more than one reason. In addition, cause-effect network is usual in projects, an effect of a cause will lead to other effects. This chain will continue and a network of causes and effects will be shaped. So, recognizing the causes of effects and anticipating them by early warning signs may help in success achievement of projects.

Problem statement

There are some papers under Early warning signs topic discussed the theory of Igor Ansoff and definition of early warning and elements which are contributing in recognition of these signs. According to Ilmari O Nikander and Eero Eloranta`s article some of the authors believed that early warning signs are too weak to be recognized on time (?) while some emphasizing that always there are some signs that can be recognized. Generally the concept of early warning signs is underrepresented. What is lack within project management literature about early warning is that only few number of studies paid detailed attention toward how to find the weak signs and why sometimes these signals are not recognized on time (?).

On the other side, it seems that traditional project management methods are not adequate for predicting problems before happening and new tools are needed (?).The first step in developing new methods for managing early warning signs is identifying shortfalls of traditional methods of project management and the reasons they are not appropriate for dealing with problems (?)

In this study, it will be tried to answer following questions:

(1) How Root-Cause analysis and its results can be used as a new early warning system?
(2) What are the strengths and weaknesses of the approach?

Objectives and Scope of work:

This paper will be conducted through a literature review on the area of early warning signs of projects. The main sources of theoretical information are scientific papers, books, published case studies and the Project Management Body Of Knowledge (PMBOK©). Due to time limitation and difficulty of finding companies this project includes no case study, just theoretical issues will be investigated qualitatively. Therefore, the source of data required for this project will be collected from different papers and books. The study does not focus on specific project types.

The main objectives of this research are covering following issues:

- Why traditional ways of project management are not suitable in project success
- How to recognize early warning signs and why often they are not seen in projects
- Discuss if Root- Cause analysis approach can be used as a suitable early warning system

Research approach:

The aim of this project is to conduct a theoretical and qualitative research about a new suggested approach in project management which is "Application of Root-Cause Analysis as an Early Warning System".
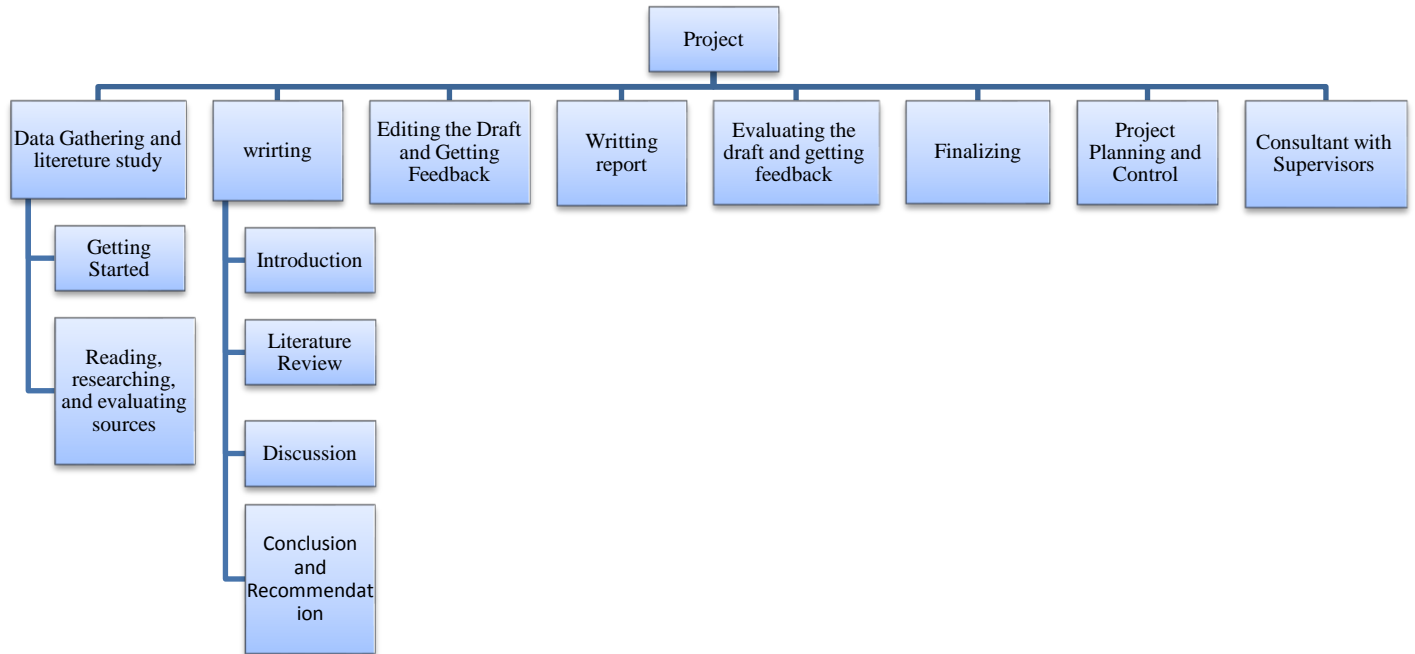
At first, scientific databases will be searched in order to find relevant articles, books, journal papers and published case studies. Next, the theory of weak signals will be developed and then the failure reason of traditional project management methods in recognizing early warning signs will be pointed. In the next step the theory of cause-effect analysis will be developed according to the literature study. Afterwards, the research questions that are expected to be answered will be discussed. Finally, a conclusion would be made according the finding from literature research and discussion part of the paper. The whole paper will cover the research goals.

Master Plan for the work:

A work breakdown structure has been developed in order to fulfill the objective of this project. Besides, the activities that should be done with approximate estimated duration are shown in the attached plan. In addition, Project main milestones and deliverables have been identified in this plan.

The project will contain some progress reports including the status of actual work in comparison with what has been planned and deviation reports.

Work Breakdown Structure (WBS):

```
                                         ┌──────────────┐
                                         │   Project    │
                                         └──────┬───────┘
   ┌────────────┬──────────┬───────────┬────────┼──────────┬───────────┬──────────────┐
┌──────────┐ ┌────────┐ ┌──────────┐ ┌────────┐ ┌──────────┐ ┌──────────┐ ┌──────────┐ ┌────────────┐
│Data      │ │writing │ │Editing   │ │Writing │ │Evaluating│ │Finalizing│ │Project   │ │Consultant  │
│Gathering │ │        │ │the Draft │ │report  │ │the draft │ │          │ │Planning  │ │with        │
│and       │ │        │ │and       │ │        │ │and       │ │          │ │and       │ │Supervisors │
│litereture│ │        │ │Getting   │ │        │ │getting   │ │          │ │Control   │ │            │
│study     │ │        │ │Feedback  │ │        │ │feedback  │ │          │ │          │ │            │
└────┬─────┘ └───┬────┘ └──────────┘ └────────┘ └──────────┘ └──────────┘ └──────────┘ └────────────┘
 ┌───┴────┐  ┌───┴─────┐
 │Getting │  │Introduc-│
 │Started │  │tion     │
 └────────┘  └─────────┘
 ┌────────┐  ┌─────────┐
 │Reading,│  │Literature│
 │research│  │Review   │
 │ing, and│  └─────────┘
 │evaluat-│  ┌─────────┐
 │ing     │  │Discussion│
 │sources │  └─────────┘
 └────────┘  ┌─────────┐
             │Conclusion│
             │and      │
             │Recommen-│
             │dation   │
             └─────────┘
```

It should be mentioned that only main activities are shown in the above Structure, the deliverables are mentioned in the attached time schedule (plan).

References:

1) Ilmari O.Nikander.(2002). Early Warnings a phenomenon in project management.
2) Ole Jonny Klakegg…[et al].(2010). Early wanrning signs in complex projects.
3) Ilmari O Nikander and Eero Eloranta.(1997). Preliminary Signals and early warnings in industrial investment projects.(international journal of project management)
4) Ilmari O Nikander and Eero Eloranta.(2001). Project management by early warning, (international journal of project management)

APPENDIX

ID	WBS	Task Name	Duration	Start	Finish	September 24.08 07.09 21.09	October 05.10 19.10	November 02.11 16.11	December 30.11 14.12
0	0	**Specialization project plan**	**146.75 days**	**Sun 01.09.13**	**Mon 16.12.13**				
1	1	**Start**	**0 days**	**Sun 01.09.13**	**Sun 01.09.13**	01.09			
2	2	**Data Gathering and literature study**	**99 days**	**Sun 01.09.13**	**Mon 11.11.13**				
3	2.1	**Getting started**	**22 days**	**Sun 01.09.13**	**Mon 16.09.13**				
4	2.1.1	Understand the assignment and requirements	3 days	Sun 01.09.13	Tue 03.09.13	Understand the assignment and requirements			
5	2.1.2	narrow the given topic	4 days	Tue 03.09.13	Fri 06.09.13	narrow the given topic			
6	2.1.3	Determine the preliminary types of sources to use	3 days	Fri 06.09.13	Sun 08.09.13	Determine the preliminary types of sources to use			
7	2.1.4	Do preliminary research to discover the important issues	7 days	Sun 08.09.13	Fri 13.09.13	Do preliminary research to discover the importa			
8	2.1.5	Prepare a pre-study report	5 days	Fri 13.09.13	Mon 16.09.13	Prepare a pre-study report			
9	2.1.6	submit the prestudy report	0 days	Mon 16.09.13	Mon 16.09.13	16.09			
10	2.2	**Reading, researching, and evaluating sources**	**77 days**	**Tue 17.09.13**	**Mon 11.11.13**				
11	2.2.1	Find print and online sources	3 days	Tue 17.09.13	Thu 19.09.13	Find print and online sources			
12	2.2.2	Annotate and evaluate the sources	1 day	Thu 19.09.13	Thu 19.09.13	Annotate and evaluate the sources			
13	2.2.3	Write summaries and paraphrases and make notes	3 days	Thu 19.09.13	Sun 22.09.13	Write summaries and paraphrases and make			
14	2.2.4	Set up a working bibliography	1 day	Sun 22.09.13	Sun 22.09.13	Set up a working bibliography			
15	2.2.5	Reading sources	70 days	Sun 22.09.13	Mon 11.11.13	Reading sources			
16	3	**Writing**	**72 days**	**Sun 22.09.13**	**Wed 13.11.13**				
17	3.1	Introduction	7 days	Sun 22.09.13	Fri 27.09.13	Introduction			
18	3.2	Literature Review	21 days	Fri 27.09.13	Sat 12.10.13	Literature Review			
19	3.3	Progress report	3 days	Sat 12.10.13	Mon 14.10.13	Progress report			
20	3.4	Submitting the progress report	0 days	Mon 14.10.13	Mon 14.10.13	14.10			
21	3.5	Discussion	30 days	Mon 14.10.13	Tue 05.11.13	Discussion			
22	3.6	Conclusion & Recommendation	10 days	Tue 05.11.13	Tue 12.11.13	Conclusion & Recor			
23	3.7	References	1 day	Tue 12.11.13	Wed 13.11.13	References			
24	4	**Evaluating the draft and getting feedback**	**27 days**	**Wed 13.11.13**	**Tue 03.12.13**				
25	4.1	Review the draft and Edit if necessary	11 days	Wed 13.11.13	Thu 21.11.13	Review the draft			
26	4.2	Plan more research as necessary to fill any gaps	8 days	Thu 21.11.13	Wed 27.11.13	Plan more res			
27	4.3	Get feedback from supervisor	8 days	Wed 27.11.13	Tue 03.12.13	Get feedba			
28	5	**Finalizing, presenting**	**18 days**	**Tue 03.12.13**	**Mon 16.12.13**				
29	5.1	Review and Quality check	7 days	Tue 03.12.13	Sun 08.12.13	Review a			
30	5.2	Design the format of the paper	7 days	Sun 08.12.13	Fri 13.12.13	Desig			
31	5.3	finalizing	4 days	Fri 13.12.13	Mon 16.12.13	final			
32	5.4	Submitt the final draft	0 days	Mon 16.12.13	Mon 16.12.13	16.1			
33	6	**Project Planning and Control**	**145.38 days**	**Sun 01.09.13**	**Sun 15.12.13**				
34	6.1	Weekly report1	1 day	Sun 01.09.13	Sun 01.09.13	Weekly report1			
35	6.2	Weekly report2	1 day	Sun 08.09.13	Sun 08.09.13	Weekly report2			
36	6.3	Weekly report3	1 day	Sun 15.09.13	Sun 15.09.13	Weekly report3			
37	6.4	Weekly report4	1 day	Sun 22.09.13	Sun 22.09.13	Weekly report4			

Project: Specialization project plan
Date: Mon 16.09.13

Task | Summary | Progress
Milestone ◆ | Project Summary

Page 1

ID	WBS	Task Name	Duration	Start	Finish	September	October	November	December
38	6.5	Weekly report5	1 day	Sun 29.09.13	Sun 29.09.13			Weekly report5	
39	6.6	Weekly report6	1 day	Sun 06.10.13	Sun 06.10.13			Weekly report6	
40	6.7	Weekly report7	1 day	Sun 13.10.13	Sun 13.10.13			Weekly report7	
41	6.8	Weekly report8	1 day	Sun 20.10.13	Sun 20.10.13			Weekly report8	
42	6.9	Weekly report10	1 day	Sun 27.10.13	Sun 27.10.13			Weekly report10	
43	6.10	Weekly report11	1 day	Sun 03.11.13	Sun 03.11.13			Weekly report11	
44	6.11	Weekly report12	1 day	Sun 10.11.13	Sun 10.11.13			Weekly report12	
45	6.12	Weekly report13	1 day	Sun 17.11.13	Sun 17.11.13			Weekly report13	
46	6.13	Weekly report14	1 day	Sun 24.11.13	Sun 24.11.13			Weekly report	
47	6.14	Weekly report15	1 day	Sun 01.12.13	Sun 01.12.13				Weekly rep
48	6.15	Weekly report16	1 day	Sun 08.12.13	Sun 08.12.13				Weekly
49	6.16	Weekly report17	1 day	Sun 15.12.13	Sun 15.12.13				Wee
50	**7**	**Consultance with supervisor**	**145.38 days**	**Mon 02.09.13**	**Mon 16.12.13**				
51	7.1	Meeting1	1 day	Mon 02.09.13	Mon 02.09.13	Meeting1			
52	7.2	Meeting2	1 day	Mon 09.09.13	Mon 09.09.13	Meeting2			
53	7.3	Meeting3	1 day	Mon 16.09.13	Mon 16.09.13	Meeting3			
54	7.4	Meeting4	1 day	Mon 23.09.13	Mon 23.09.13	Meeting4			
55	7.5	Meeting5	1 day	Mon 30.09.13	Mon 30.09.13		Meeting5		
56	7.6	Meeting6	1 day	Mon 07.10.13	Mon 07.10.13		Meeting6		
57	7.7	Meeting7	1 day	Mon 14.10.13	Mon 14.10.13		Meeting7		
58	7.8	Meeting8	1 day	Mon 21.10.13	Mon 21.10.13		Meeting8		
59	7.9	Meeting9	1 day	Mon 28.10.13	Mon 28.10.13		Meeting9		
60	7.10	Meeting10	1 day	Mon 04.11.13	Mon 04.11.13			Meeting10	
61	7.11	Meeting11	1 day	Mon 11.11.13	Mon 11.11.13			Meeting11	
62	7.12	Meeting12	1 day	Mon 18.11.13	Mon 18.11.13			Meeting12	
63	7.13	Meeting13	1 day	Mon 25.11.13	Mon 25.11.13			Meeting13	
64	7.14	Meeting14	1 day	Mon 02.12.13	Mon 02.12.13				Meeting14
65	7.15	Meeting15	1 day	Mon 09.12.13	Mon 09.12.13				Meeting
66	7.16	Meeting16	1 day	Mon 16.12.13	Mon 16.12.13				Mee
67	**8**	**Finish**	**0 days**	**Mon 16.12.13**	**Mon 16.12.13**				◆ 16.1

Project: Specialization project plan
Date: Mon 16.09.13

| Task | Summary | Progress |
| Milestone ◆ | Project Summary | |

Page 2