



Norwegian University of  
Science and Technology

**Progress Report-October**

**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

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## Introduction

Despite of development and improvement in today project management methods and tools, still large numbers of projects are experiencing failure or turbulent situations. According to Igor Ansoff There are some weak signals which can be identified at early stages of projects. These weak signals will get stronger as time passes. The signals, which were called early warning signs by Nikander, help management in anticipating problems and implementing actions in order to prevent them from happening later in projects. In another words, identifying early warning signs contribute in pro-active management of project. The issue is that the signals usually are not taken into account at the time and become stronger. Therefore the problem appears and leads to project failure, large amount of losses, rework, and so on. Addressing early warning signs early enough and implementing actions toward them before their full impact contributes in project success. Some tools and techniques are available for identifying early warning signs such as risk analysis, project assessment, decision support model of early warnings, performance measurement system and so on.

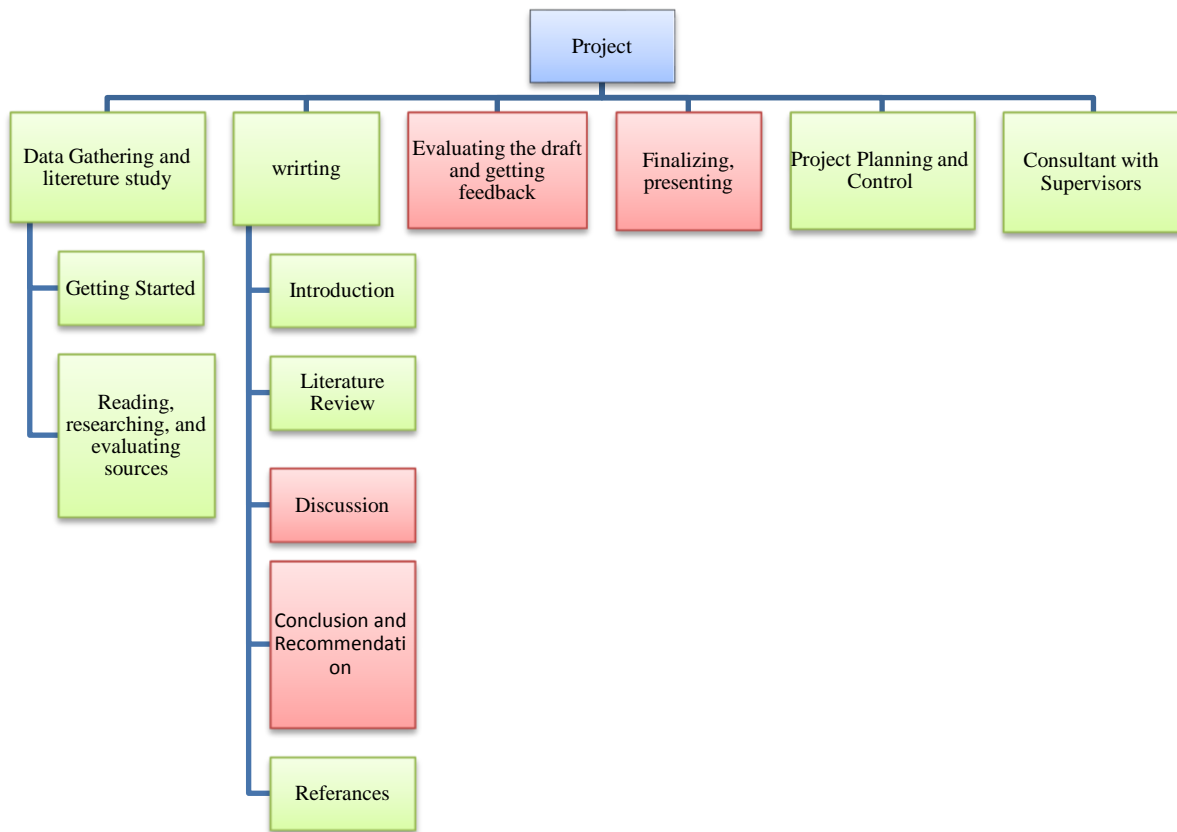
This project work investigates the application of a well-known tool, Root-Cause-Analysis, as an early warning sign detection system. No previous work has been identified which links these two terms together. So, this paper will look at both early warning signs and root-cause-analysis literatures. Then, the usability of the approach will be examined through evaluation of an unsuccessful project to see which information and actions could have been revealed if they had been noticed on time, and finally the usability of the approach will be concluded.

The goal of this project work is to examine the application of Root-Cause-Analysis approach as an early warning system in projects and evaluate its strengths and weaknesses as an early warning source.

The following research questions will be answered in this project work:

- 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?

### Work Breakdown Structure (WBS):



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

## What has been done so far?

- 1) The problem statement has been understood (100%)
- 2) Relevant sources of information (articles, books, journals, and case studies) has been collected (90%)
- 3) Collected sources has been studied and evaluated (90%)
- 4) First draft of the literature review is written (80%)

### Detail of what is written in the literature review part so far:

First chapter of this project contains a short description of literature study about system theory and the issue of complexity. I found these topics related to my project work if consider a project as a system which has different tasks and relationships among them, also considering root cause analysis approach which is about a chain of problems and their causes. So, they are systems and considering the properties of systems when evaluating them would be beneficial.

The second chapter contains a comprehensive literature review of Root cause analysis approach. The definition of the theory and How to implement root cause analysis process is explained completely according to literature study. Fish bone diagram as one important tool in identification root of causes is pointed. In addition, some organizational and human factors which will cause failure in understanding root of causes are mentioned. And at the end some suggestions according to literature study is given to improve finding the root of causes. In this part I could not find many articles and papers through data bases, so more research is needed in this part.

Third chapter includes the literature study and evaluation of early warning signs theory. This part contains the definition of the weak signals, the importance of identification of the early warning signs in the front-end stage of project, the process of early warning signs identification, the chain of early warning signs/causes of problems/project problems/and responses, complexity and its effect on the identification of weak signals, human factors affecting on identification of weak signals(still needs more literature study), organizational characteristics which may affect project work(still needs more literature study), how to solve the problem of not recognizing early warning signs, implementing different kind of actions based on how much time is available and when the signals are detected.

Also, the relationship between root cause analysis and early warning signs approach has been identified through literature review.

## Which tasks and deliverables are remained from the project work?

- 1) Improving literature review
- 2) Evaluating a case study of an unsuccessful project and the reasons of failure
- 3) Discussion and Conclusion
- 4) Finalizing the project work

**Planned and Actual Progress:**

<b>Plan % Complete</b>	<b>43.8%</b>
<b>Actual % Complete</b>	<b>38.8%</b>
<b>%Delay</b>	<b>11%</b>

**S-Curve (Plan and Actual):**

Attached in the appendix.

**Update Time Schedule of project:**

Attached in the appendix

**Reason of Delays:**

- Difficulties in finding relevant articles because of lack of previous work done on this project topic

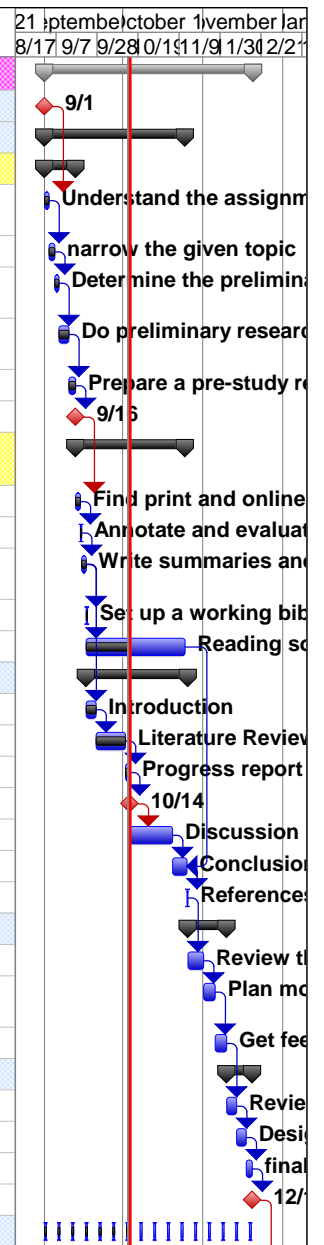
**Recommendations for overcoming the delay:**

- Meeting with supervisors and ask for literatures resource suggestions, as soon as find the related sources the delay will be overcome.

# APPENDIX



ID	WBS	Task Name	Duration	Start	Finish	W.F	Plan	Actual	Deviation	21 8/17	September 9/7	October 9/28	November 10/1	January 11/9	January 11/30	2013 2/21
0	0	<b>Specialization project plan</b>	<b>146.75 days</b>	<b>Sun 9/1/13</b>	<b>Mon 12/16/13</b>	<b>100</b>	<b>43.8</b>	<b>38.8</b>	<b>-5</b>							
1	1	<b>Start</b>	<b>0 days</b>	<b>Sun 9/1/13</b>	<b>Sun 9/1/13</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>							
2	2	<b>Data Gathering and literature study</b>	<b>99 days</b>	<b>Sun 9/1/13</b>	<b>Mon 11/11/13</b>	<b>30</b>	<b>24.4</b>	<b>28.8</b>	<b>4.4</b>							
3	2.1	<b>Getting started</b>	<b>22 days</b>	<b>Sun 9/1/13</b>	<b>Mon 9/16/13</b>	<b>16</b>	<b>16</b>	<b>16</b>	<b>0</b>							
4	2.1.1	Understand the assignment and requirements	3 days	Sun 9/1/13	Tue 9/3/13	4	4	4	0							
5	2.1.2	narrow the given topic	4 days	Tue 9/3/13	Fri 9/6/13	4	4	4	0							
6	2.1.3	Determine the preliminary types of sources to use	3 days	Fri 9/6/13	Sun 9/8/13	3	3	3	0							
7	2.1.4	Do preliminary research to discover the important issues	7 days	Sun 9/8/13	Fri 9/13/13	4	4	4	0							
8	2.1.5	Prepare a pre-study report	5 days	Fri 9/13/13	Mon 9/16/13	1	1	1	0							
9	2.1.6	submit the prestudy report	0 days	Mon 9/16/13	Mon 9/16/13	0	0	0	0							
10	2.2	<b>Reading, researching, and evaluating sources</b>	<b>77 days</b>	<b>Tue 9/17/13</b>	<b>Mon 11/11/13</b>	<b>14</b>	<b>8.4</b>	<b>12.8</b>	<b>4.4</b>							
11	2.2.1	Find print and online sources	3 days	Tue 9/17/13	Thu 9/19/13	1	1	0.9	-0.1							
12	2.2.2	Annotate and evaluate the sources	1 day	Thu 9/19/13	Thu 9/19/13	1	1	0.9	-0.1							
13	2.2.3	Write summaries and paraphrases and make notes	3 days	Thu 9/19/13	Sun 9/22/13	1	1	1	0							
14	2.2.4	Set up a working bibliography	1 day	Sun 9/22/13	Sun 9/22/13	1	1	1	0							
15	2.2.5	Reading sources	70 days	Sun 9/22/13	Mon 11/11/13	10	4.4	9	4.6							
16	3	<b>Writing</b>	<b>72 days</b>	<b>Sun 9/22/13</b>	<b>Wed 11/13/13</b>	<b>30</b>	<b>11</b>	<b>10</b>	<b>-1</b>							
17	3.1	Introduction	7 days	Sun 9/22/13	Fri 9/27/13	5	5	5	0							
18	3.2	Literature Review	21 days	Fri 9/27/13	Sat 10/12/13	5	5	4	-1							
19	3.3	Progress report	3 days	Sat 10/12/13	Mon 10/14/13	1	1	1	0							
20	3.4	Submitting the progress report	0 days	Mon 10/14/13	Mon 10/14/13	0	0	0	0							
21	3.5	Discussion	30 days	Mon 10/14/13	Tue 11/5/13	10	0	0	0							
22	3.6	Conclusion & Recommendation	10 days	Tue 11/5/13	Tue 11/12/13	7	0	0	0							
23	3.7	References	1 day	Tue 11/12/13	Wed 11/13/13	2	0	0	0							
24	4	<b>Evaluating the draft and getting feedback</b>	<b>27 days</b>	<b>Wed 11/13/13</b>	<b>Tue 12/3/13</b>	<b>15</b>	<b>0</b>	<b>0</b>	<b>0</b>							
25	4.1	Review the draft and Edit if necessary	11 days	Wed 11/13/13	Thu 11/21/13	5	0	0	0							
26	4.2	Plan more research as necessary to fill any gaps	8 days	Thu 11/21/13	Wed 11/27/13	5	0	0	0							
27	4.3	Get feedback from supervisor	8 days	Wed 11/27/13	Tue 12/3/13	5	0	0	0							
28	5	<b>Finalizing, presenting</b>	<b>18 days</b>	<b>Tue 12/3/13</b>	<b>Mon 12/16/13</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>0</b>							
29	5.1	Review and Quality check	7 days	Tue 12/3/13	Sun 12/8/13	2	0	0	0							
30	5.2	Design the format of the paper	7 days	Sun 12/8/13	Fri 12/13/13	2	0	0	0							
31	5.3	finalizing	4 days	Fri 12/13/13	Mon 12/16/13	1	0	0	0							
32	5.4	Submitt the final draft	0 days	Mon 12/16/13	Mon 12/16/13	0	0	0	0							
33	6	<b>Project Planning and Control</b>	<b>145.38 days</b>	<b>Sun 9/1/13</b>	<b>Sun 12/15/13</b>	<b>10</b>	<b>4.2</b>	<b>0</b>	<b>-4.2</b>							



Project: Specialization project plan  
Date: Mon 10/14/13

Task Summary Progress

Milestone Project Summary



ID	WBS	Task Name	Duration	Start	Finish	W.F	Plan	Actual	Deviation	21 September 2013	28 September 2013	5 October 2013	12 October 2013	19 October 2013	26 October 2013	2 November 2013	9 November 2013	16 November 2013	23 November 2013	30 November 2013	7 December 2013	14 December 2013	21 December 2013		
34	6.1	Weekly report1	1 day	Sun 9/1/13	Sun 9/1/13	0.6	0.6	0	-0.6																
35	6.2	Weekly report2	1 day	Sun 9/8/13	Sun 9/8/13	0.6	0.6	0	-0.6																
36	6.3	Weekly report3	1 day	Sun 9/15/13	Sun 9/15/13	0.6	0.6	0	-0.6																
37	6.4	Weekly report4	1 day	Sun 9/22/13	Sun 9/22/13	0.6	0.6	0	-0.6																
38	6.5	Weekly report5	1 day	Sun 9/29/13	Sun 9/29/13	0.6	0.6	0	-0.6																
39	6.6	Weekly report6	1 day	Sun 10/6/13	Sun 10/6/13	0.6	0.6	0	-0.6																
40	6.7	Weekly report7	1 day	Sun 10/13/13	Sun 10/13/13	0.6	0.6	0	-0.6																
41	6.8	Weekly report8	1 day	Sun 10/20/13	Sun 10/20/13	0.6	0	0	0																
42	6.9	Weekly report10	1 day	Sun 10/27/13	Sun 10/27/13	0.6	0	0	0																
43	6.10	Weekly report11	1 day	Sun 11/3/13	Sun 11/3/13	0.6	0	0	0																
44	6.11	Weekly report12	1 day	Sun 11/10/13	Sun 11/10/13	0.6	0	0	0																
45	6.12	Weekly report13	1 day	Sun 11/17/13	Sun 11/17/13	0.6	0	0	0																
46	6.13	Weekly report14	1 day	Sun 11/24/13	Sun 11/24/13	0.7	0	0	0																
47	6.14	Weekly report15	1 day	Sun 12/1/13	Sun 12/1/13	0.7	0	0	0																
48	6.15	Weekly report16	1 day	Sun 12/8/13	Sun 12/8/13	0.7	0	0	0																
49	6.16	Weekly report17	1 day	Sun 12/15/13	Sun 12/15/13	0.7	0	0	0																
50	7	Consultance with supervisor	145.38 days	Mon 9/2/13	Mon 12/16/13	10	4.2	0	-4.2																
51	7.1	Meeting1	1 day	Mon 9/2/13	Mon 9/2/13	0.6	0.6	0	-0.6																
52	7.2	Meeting2	1 day	Mon 9/9/13	Mon 9/9/13	0.6	0.6	0	-0.6																
53	7.3	Meeting3	1 day	Mon 9/16/13	Mon 9/16/13	0.6	0.6	0	-0.6																
54	7.4	Meeting4	1 day	Mon 9/23/13	Mon 9/23/13	0.6	0.6	0	-0.6																
55	7.5	Meeting5	1 day	Mon 9/30/13	Mon 9/30/13	0.6	0.6	0	-0.6																
56	7.6	Meeting6	1 day	Mon 10/7/13	Mon 10/7/13	0.6	0.6	0	-0.6																
57	7.7	Meeting7	1 day	Mon 10/14/13	Mon 10/14/13	0.6	0.6	0	-0.6																
58	7.8	Meeting8	1 day	Mon 10/21/13	Mon 10/21/13	0.6	0	0	0																
59	7.9	Meeting9	1 day	Mon 10/28/13	Mon 10/28/13	0.6	0	0	0																
60	7.10	Meeting10	1 day	Mon 11/4/13	Mon 11/4/13	0.6	0	0	0																
61	7.11	Meeting11	1 day	Mon 11/11/13	Mon 11/11/13	0.6	0	0	0																
62	7.12	Meeting12	1 day	Mon 11/18/13	Mon 11/18/13	0.6	0	0	0																
63	7.13	Meeting13	1 day	Mon 11/25/13	Mon 11/25/13	0.7	0	0	0																
64	7.14	Meeting14	1 day	Mon 12/2/13	Mon 12/2/13	0.7	0	0	0																
65	7.15	Meeting15	1 day	Mon 12/9/13	Mon 12/9/13	0.7	0	0	0																
66	7.16	Meeting16	1 day	Mon 12/16/13	Mon 12/16/13	0.7	0	0	0																
67	8	Finish	0 days	Mon 12/16/13	Mon 12/16/13	0	0	0	0																

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Task



Summary



Progress



Milestone



Project Summary

