

I PRO 303 Midterm Report

Fall 2007

Information Design for Plant Management to Predict Equipment Failure

Advisors:

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Donatas Tijunelis

1.0. Revised Objectives

As mentioned in the project plan, our IPRO continues to conduct further research based on the previous semester research outcomes. In order to understand the working of the maintenance process in a coal fired power plant they deduced that the 'Engineering Specialists' , 'Operations Managers' and 'Shift Supervisors' are the key personnel who need to be studied better. Based on these findings our primary goals were and are:

- To conduct a "Day-in-the-Life" study for these personnel by direct solicitation of information from plant personnel.
- Develop methods to gather this information such as surveys and/or interviews.
- Compile the gathered data into a comprehensive report which should benefit the sponsor in better understanding their potential users.

During our tours through power plants, we discovered that even though these three personnel are very important in the maintenance process, another individual, 'the Unit Operator' is the person who will be the actual operator of the sponsor's software product. Thus we also intend to include the Unit Operator in our study along with the above three personnel and predict that the information gather from this will benefit our sponsor and our final report to a greater degree.

2.0. Results to Date

- A. Describe current data results from research or testing involved in the project.

After conduction of interviews and tours of power plants, we were able to grasp a brief idea of the functioning the maintainence cycle, even though each and every interview has not be analyzed in details as we are waiting on results from other scheduled interviews, here is some information that we can summarize in general for the power plants based on the data gathered till date.

Data gathered:

No of coal fired power plants reviewed: 4

No of interviews collected: 12

Summary of Data:

Summary of Job Functions of:

Operations Manager: Work daytime only during business hours. Is responsible for making sure equipment is running as required. Conducts meetings and addresses concerns and forwards maintenance requests to the Engineering Department.

Engineering Specialist: Conducts planned maintenance and is primarily responsible for planning current and future maintenance and up gradation on equipment.

Shift Supervisor: Is not necessarily from an Engineering background, there is a shift supervisor present at all times. They work eight hour shifts and are responsible for maintaining a log of all events occurring during his or her shift and forwarding this information to the next shift supervisor and to the engineering staff if required.

Unit Operator: Is the person who sits in the monitoring room where all plant equipment is monitored and reports directly to shift supervisor should any warnings show up.

Another piece of Information we got from the people interviewed was how they prioritize their actions, they consider the following aspect in the order shown:

- I. SAFETY CONCERNS: Should the present warning be a safety hazard to the plant and the people in and within the vicinity.
- II. ENVIRONMENTAL CONCERNS: If there is high emission issues and is going over the regulated norms.
- III. COST: Will the present issue affect the cost per Megawatt and cause losses or low profit.

- B. Define current or potential products or outputs resulting from research and testing.

The final report based on the research result shown above (in more detail) will help better understand the maintenance process and priorities and concerns of the plant staff while conducting maintenance and monitoring.

- C. Discuss the current results in terms of deliverables that will be produced by the project team.

The team's final deliverables will be a comprehensive report on how maintenance is conducted in a power plant and these results are the very information needed in the report.

- D. Discuss whether or not the current results address the problem of the sponsor.

The sponsor has demanded such a report as they need it to improve their plant management software so it is more customer oriented and for this they need to better understand their customers which this report will help them in.

- E. Discuss how the current results will be incorporated into the proposed solution or solution framework.

The current results and results gather after conducted more interviews will help us understand different aspects to the work life of potential customers of the sponsors which will be our solution to the proposed problem i.e. "Day-in-Life" study of the maintenance personnel.

3.0. Revised Task / Event Schedule

- A. Describe any changes in project tasks pertaining to the problem solution or project design.

Sub-team Contact

The schedule of contact team is delayed. Because it took longer time to contact the power plants and get the response from them than we expected.

Sub-team Questionnaire

Collecting data and prioritizing the questions needed more time than we expected. Thus, the schedule of questionnaire team was put off.

Sub-team Deliverable

The IPRO deliverable team does not have any change so far.

Sub-team Interview

Interview team is responsible for the interviewing of all acquired contacts and questions from contact team and questionnaire team. Entire team members will participate in interviewing.

Sub-team Statistic Analysis

Once the questionnaire team and contact team complete their responsibilities, the analysis team will compile answers from interviewing and analyze the data statistically. Entire team members will participate in this work.

- B. Include any changes to summary tasks or sub tasks pertaining to IPRO project deliverables, list all associated due dates and/or start and end dates.
- C. Include a revised estimate of hours needed and number of team members needed to complete each summary task.

Questionnaire Team

Task	Hours	Start	Finish	Resources	status
Compile Questions	28	9/7/07	9/25/07	Tania, Ivan	Completed
Presentation of Questions for team discussion	1	9/25/07	9/25/07	Tania, Ivan	Completed
Prioritize and Categorize questions			<u>10/7/07</u>	Tania, Ivan	Completed
Review the question with Psychology Professor					
Finalize Interview Questions	12	10/3/07	<u>10/9/07</u>	Tania, Ivan	Completed
Submit Final questions to interview group	1	<u>10/9/07</u>	<u>10/9/07</u>	Tania, Ivan	Completed

Contact Team

Task	Hours	Start	Finish	Resources	status
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Research Potential Companies	4	9/13/07	9/15/07	Chike, Richard, Christian, Olufemi	Completed
Draft and Review Communication Letter	6	9/7/07	9/11/07	Chike, Richard, Christian, Olufemi	Completed
Contact 1 st Set of Powerplants and set up interviews	28	9/17/07	10/4/07	Chike, Richard, Christian, Olufemi	Completed
Schedule Plant Tour	14	10/2/07	10/10/07	Chike, Richard, Christian, Olufemi	Completed
Submit interview schedules to interviews group	6	9/7/07	9/10/07	Chike, Richard, Christian, Olufemi	
Contact 2nd Batch of Powerplants and Set up interviews	36	10/5/07	10/24/07	Chike, Richard, Christian, Olufemi	
Submit interview schedules to interview groups	2	10/10/07	10/12/07	Chike, Richard, Christian, Olufemi	Completed

Deliverable Team

Task	Hours	Start	Finish	Resources	status
Project Plan			9/28/07	Omar, Harry, Yewon	Completed
Midterm Presentation	8	10/4/07	10/8/07	Kirsten, Olufemi	Completed
Code of Ethics			10/17/07	Kirsten, Christian	Completed
Midterm Report	34	10/09/07	10/26/07	Omar, Harry, Kirsten, Yewon	Completed
Exhibit/Poster	14	11/22/07	11/30/07	Omar, Harry, Kirsten, Yewon	

Abstract/ Brochure	14	11/22/07	11/30/07	Omar, Harry, Kirsten, Yewon	
Presentation	14	11/22/07	11/30/07	All	
Final Report				Omar, Harry, Kirsten, Yewon	
I PRO Deliverable CD			11/30/07	All	
I PRO Day	8	11/30/07	11/30/07	All	

D. If necessary explain why the timeline has changed significantly from the original submitted project plan.

Waiting for the response from power plant personnel took long time than we expected. That makes change the schedule of Contact team. But it did not affect the interview schedule and the first interview was conducted successfully.

We reviewed the developed questions from questionnaire team whether the questions can bring appropriate answers and formats what we want. And we do not want to violate any ethics code. That's the reason that questionnaire team schedule was delayed. But it did not affect overall team schedule.

4.0. Changes in Task Assignments and Designation of Roles and Team Organization

A. Discuss changes to team organization.

The team structure remains the same with the members being divided into three mains groups namely Deliverables, Contact and Questionnaire.

B. Define sub team or individual sub team task assignments and responsibilities.

These groups have updated objectives as given below:

Deliverables	Objective remains same: to provide in a timely manner all I PRO office deliverables.
Questionnaire	After developing the initial questionnaire(interview format), the questionnaire group focuses on improving it based on answers we get from these interviews.
Contact	Initially the contact groups successfully scheduled

	interviews and tours with various power plants, now they should continue to get as many more interviews as possible for the IPRO team to have more data to analyze.
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- C. Describe changes since the beginning of the semester in current team member roles within the team and sub teams.

The team members are still involved in their pre assigned groups however for the conduction of interviews team members are assigned to an interview based on their schedule. The following team members have been assigned to interviews so far.

- Christian Arnoux
- Tania Atanassova
- Richard Ike
- Michael Harry
- Olufemi Sonoiki
- Harshill Parikh

Three team members from the deliverables group were assigned the responsibily of creating a website for the IPRO. They are:

- Yewon Lee
- Omar Husain
- Harry Michael

- D. If appropriate, explain how and why the team organization has changed since the project plan was first formulated.

The team organization still remains with the three subgroups created initially still intact.

- E. If applicable, attach the revised Gantt chart of remaining project tasks, remaining hours and team member assignments.

The revised Gantt chart is attached along with this report with change in deadlines and key changes as listed below;

- The Contact team has been allotted more time as response time from power plant was longer than we anticipated.
- Assignment of team members have been made for Website

5.0. Barriers and Obstacles

A. Obstacles encountered

- It took us some time to really understand what the objective of our IPRO is. Coming into the IPRO many of us thought we were working with the software to improve how useful it is. Our objective is really to study the individuals that work on the problems that the software addresses.
- It took us a long time to set up our team structure and elect a team leader.
- Developing our questionnaire was difficult. All of our team members were new to the project and had never been to coal fired power plant. To create a questionnaire on a topic that is foreign is a daunting task.

B. Resolving our encountered obstacles

- The first step was to bring in our sponsor so that they could explain what it was they were looking for. They left us with a much better understanding the goal but it still left us with some confusion. We didn't realize that there was still some confusion until later when developing the questionnaire. Our instructors had worked with our sponsor last semester and really understood what they were looking for. They were able to redirect us to the final goal of the project.
- We had many long discussions on what our team members had done in their past IPROs for team structure. We voted on how our team should be set up and who our leader would be. The extra time was a good choice because it set us up for good team work throughout the semester.
- Our Questionnaire subteam worked very hard to create and revise our current questionnaire. They came up with drafts for the whole group make suggestions and revisions on. Our instructors were able to give us very

helpful suggestions from their experience with the interviewing from the last IPRO. During our first tour and interviews we were able to test out the questions. It gave us a good idea of what needed to be added. Throughout the semester they will continue to make sure that the questionnaire is fulfilling its purpose.

C. Identified barriers and obstacles ahead

- For our project to succeed we must complete an ample number of interviews to have an accurate picture of the employee's jobs we are studying. We are asking a lot of them to take time out of their busy schedule to meet with us. It may be difficult to get the number of interviews we have planned on.
- With the semester half way through we are concerned with completing our interviews in a timely manner. It is important to have enough time to analyze our data before we must present our findings on IPRO day.

D. Resolving our identified barriers and obstacles ahead

- Our Contact subteam is made up of very dedicated individuals. They have been assigned to continue working on contacting power plants for interviews throughout the semester. With their persistence we believe we will have enough interviews to accurately answer our sponsor's questions.
- With our contact subteam working the hardest on finding interviews we must have members to go out and interview the employees. Each member submitted their schedule so that the Contact subteam can assign interviews when team members have free time. If all members put forth their best effort we will be able to finish our interviews by our milestone.

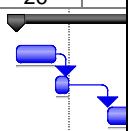
Attachments:

- ***Gantt Chart***

- ***Ethics Code (6.0)***

- ***Midterm Presentation Slides (7.0)***

ID	Task Name	Duration	Start	Finish	Predecessors	Resource Names	Sep '07	
							19	26
1	Team Organization	8 days?	Tue 8/28/07	Thu 9/6/07		Entire Team		
2	Defining the Objective	3 days	Tue 8/28/07	Thu 8/30/07				
3	Deciding on an approach	1 day	Fri 8/31/07	Fri 8/31/07	2			
4	Creation of Sub Groups based on tasks	3 days	Tue 9/4/07	Thu 9/6/07	3			
5	Allotment of Positions	0 days?	Thu 9/6/07	Thu 9/6/07	4			
6	Team Organizaion Complete	0 days	Thu 9/6/07	Thu 9/6/07	5			
7								
8								
9	Questionnaire Team Tasks	21 days	Fri 9/7/07	Thu 10/4/07	6			
10	Compile Questions	14 days	Fri 9/7/07	Tue 9/25/07		Tania and Ivan		
11	Presentation of Questions for team discussion	0 days	Tue 9/25/07	Tue 9/25/07	10	Taniaand Ivan		
12	Prioritize and Categorize questions	3 days	Wed 9/26/07	Fri 9/28/07	11	Ivan		
13	Review questions with Psychology professor	2 days	Mon 10/1/07	Tue 10/2/07	12			
14	Finalize Interview Questions	2 days	Wed 10/3/07	Thu 10/4/07	13			
15	Submit Final Questions questions to Interview group	0 days	Thu 10/4/07	Thu 10/4/07	14			
16								
17	Contact Team Task	35 days	Fri 9/7/07	Wed 10/24/07	6			
18	Research Potential Companies (Coal Power Plants)	2.67 days	Thu 9/13/07	Sat 9/15/07		Chike,Christian,Femi		
19	Draft and Review Communication Letter	3 days	Fri 9/7/07	Tue 9/11/07		Richard		
20	Contact 1st Set of Powerplants and set up Interviews	14 days	Mon 9/17/07	Thu 10/4/07	19,18	Chike O. & Christian A		
21	Schedule Plant tours	14 days	Fri 9/7/07	Tue 9/25/07				
22	Submit interview schedules to Interviews group	2 days	Fri 9/7/07	Mon 9/10/07				
23	Contact Second Batch of Powerplants and Set up interviews	14 days	Fri 10/5/07	Wed 10/24/07	20			
24	Submit Interview Schedules to Interview groups	2 days	Fri 9/7/07	Mon 9/10/07				
25								
26		1 day?	Fri 10/5/07	Fri 10/5/07	15			
27								
28	Interview tasks	14 days	Fri 10/5/07	Thu 10/25/07	26			
29	Go to 1st Batch of interview locations and conduct meeting/Interviews	14 days	Mon 10/8/07	Thu 10/25/07				
30	Submit Interview Results to Analysis group	0 days	Fri 10/5/07	Fri 10/5/07				
31	Go to 2nd Batch of interview locations and conduct meeting/Interviews	14 days	Mon 10/8/07	Thu 10/25/07				
32	Submit 2nd Set Interview Results to Analysis group	0 days	Fri 10/5/07	Fri 10/5/07				
33								
34	Analysis tasks	21 days	Fri 10/5/07	Mon 11/5/07	26			
35	Receive present Questionnaire	0 days	Fri 10/5/07	Fri 10/5/07	15			
36	Develop Approach to analyze questionnaire answers into meaningful reports.	14 days	Mon 10/8/07	Thu 10/25/07	35			
37	Receive Completed 1st Batch of Interviews	0 days	Thu 10/25/07	Thu 10/25/07	30,36			
38	Analyze 1st Interviews	7 days	Fri 10/26/07	Mon 11/5/07	37			
39	Receive 2nd Batch of Interviews	0 days	Thu 10/25/07	Thu 10/25/07	32,36			

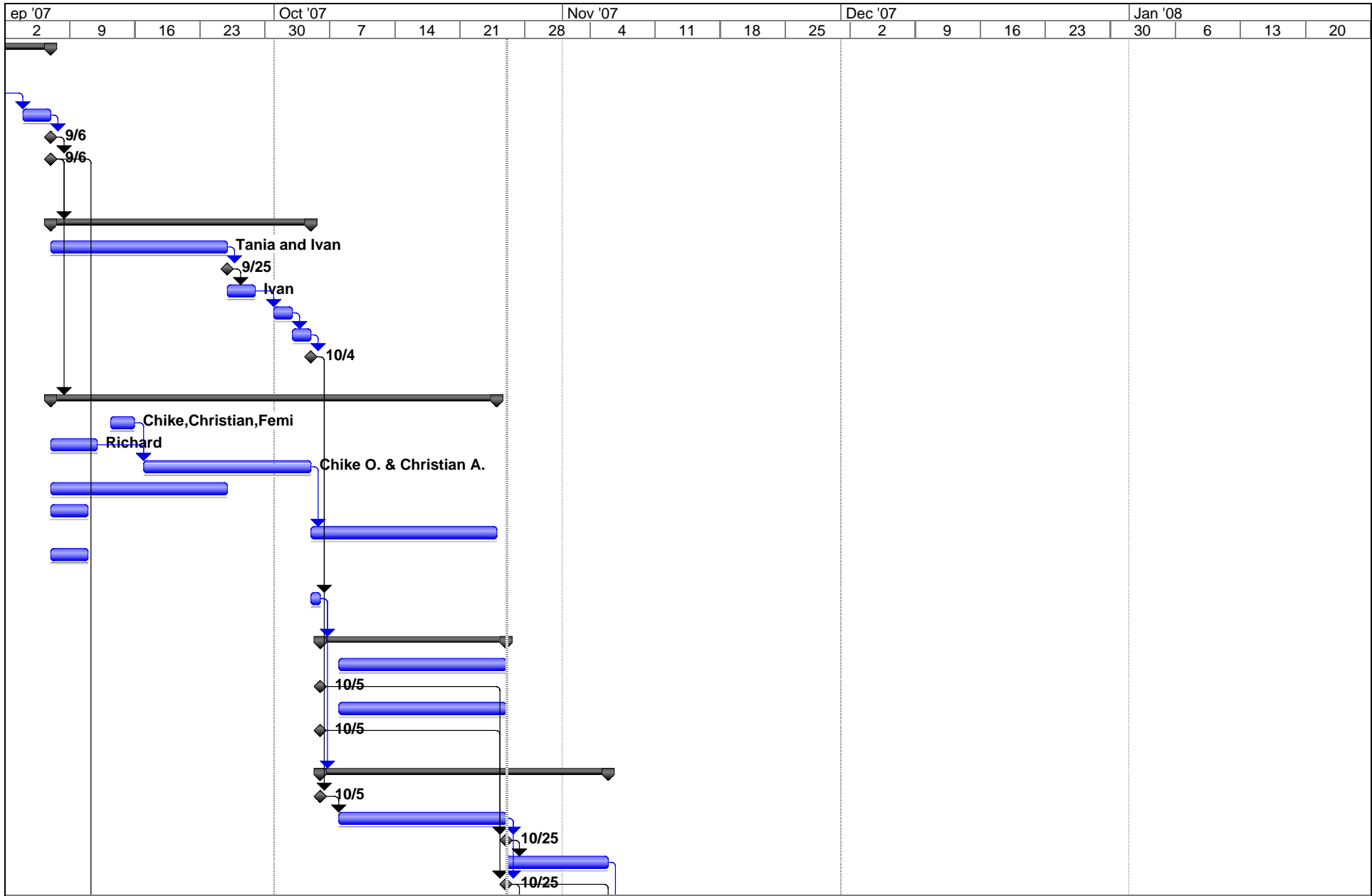


Project: Tasks and Timeline Date: Fri 10/26/07	Task		Milestone		External Tasks	
	Split		Summary		External Milestone	
	Progress		Project Summary		Deadline	

ID	Task Name	Duration	Start	Finish	Predecessors	Resource Names	Sep '07	
							19	26
40	Analyze 2nd Batch of Interviews	7 days	Fri 10/26/07	Mon 11/5/07	39			
41								
42	Deliverables	63 days?	Wed 9/12/07	Thu 12/6/07	6			
43	Project Plan	13 days?	Thu 9/13/07	Fri 9/28/07		Omar H. & Yewon L		
44	Midterm Report	13 days?	Mon 10/1/07	Wed 10/17/07	43	O.H. & K.R. & Y.L		
45	Website	14 days	Mon 10/22/07	Thu 11/8/07		O.H. & H.M. & Y.L.		
46	Abstract	14 days	Mon 10/29/07	Thu 11/15/07	44			
47	Final Presentation	21 days	Thu 10/18/07	Thu 11/15/07	44			
48	Poster	21 days	Thu 10/18/07	Thu 11/15/07	44			
49	Final Report	7 days	Tue 11/6/07	Wed 11/14/07	44,39,;			
50	Compile Minutes and Submit on 11/16	49 days?	Wed 9/12/07	Fri 11/16/07				
51	Ethics	63 days?	Wed 9/12/07	Thu 12/6/07				
52	Develop Code of ethics	16 days	Wed 9/12/07	Tue 10/2/07		Kirsten R. & Christian		
53	Monitor compliance with code of ethics in class	63 days?	Wed 9/12/07	Thu 12/6/07				
54								
55								
56								
57								
58	Estimated Completion of Project	0 days	Wed 11/14/07	Wed 11/14/07	49			

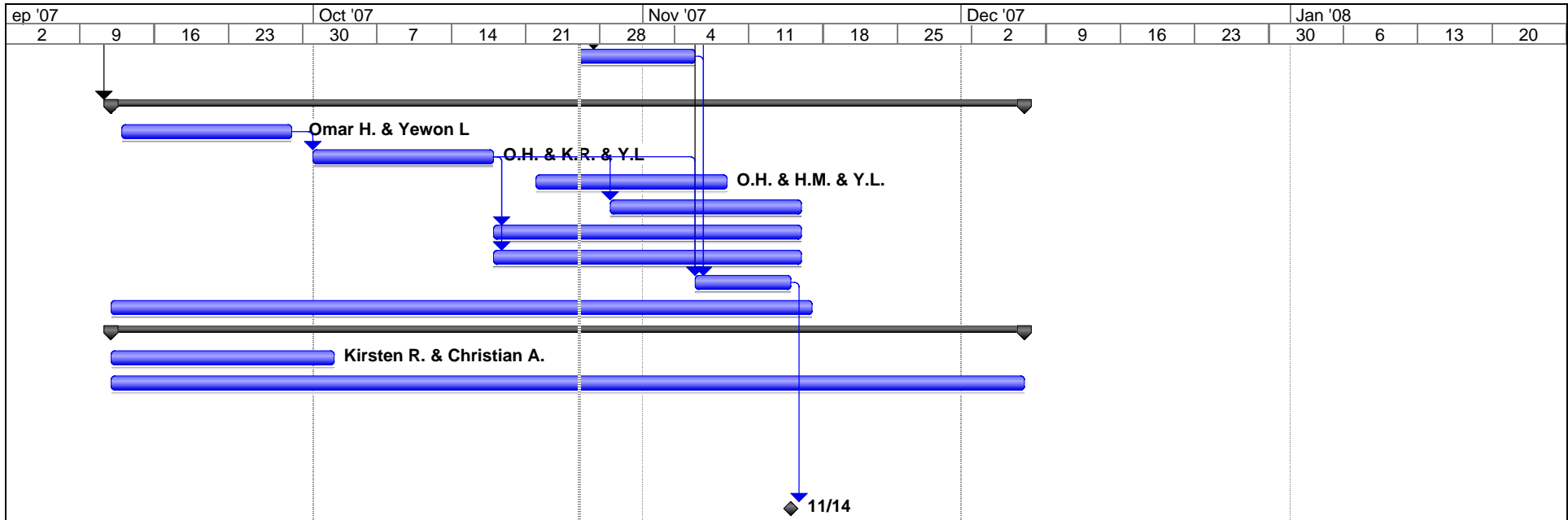


Project: Tasks and Timeline Date: Fri 10/26/07	Task		Milestone		External Tasks	
	Split		Summary		External Milestone	
	Progress		Project Summary		Deadline	



Project: Tasks and Timeline
 Date: Fri 10/26/07

Task		Milestone		External Tasks	
Split		Summary		External Milestone	
Progress		Project Summary		Deadline	



Project: Tasks and Timeline Date: Fri 10/26/07	Task		Milestone		External Tasks	
	Split		Summary		External Milestone	
	Progress		Project Summary		Deadline	

I PRO 303: Code of Ethics

Fall 2007

Information Design for Plant Management to Predict Equipment Failure

Advisors:

Donald Chmielewski
Donatas Tijunelis

Overarching Standard

To conduct ourselves responsibly, honorably, morally, and lawfully while working towards our IPRO objective in order to retain the honor and reputation of each individual on the team and the Illinois Institute of Technology.

Law

- Canon: While on site each member will follow the rules and regulations of the power plant.
- Pressure: To collect as much information as possible.
- Risk 1: Taking pictures of the plant for our final report.
- Risk 2: Leaving the group during the tour to see other parts of the plant not toured for safety reasons.
- Measure: Plant security and personal are required to enforce their rules and regulations.

Contracts

- Canon: Each member will strive to keep both parties anonymous.
- Pressure 1: To present very thorough data to our sponsor.
- Pressure 2: To keep the name of our sponsor concealed.
- Risk 1: Giving information on an interviewed company that is confidential.
- Risk 2: Giving out the name of our sponsor therefore affecting the answers of the interviewee.
- Measure: Each interview will be given with at least two IPRO members that can hold each other to the canon.

Professional Codes

- Canon: Our team will report results in a truthful manner.
- Pressure: To finish the project by IPRO day.
- Risk 1: Falsifying information by making up fake interviews.
- Risk 2: Plagiarizing the work of last years IPRO members to fill gaps in our research.
- Measure: The final report from last semester is available to each member of the team to view and they will be asked to review our deliverables for plagiarism.

Industry Standards

- Canon: Our team will report results in an objective manner.
- Pressure: Providing our sponsor with the data and solution we believe they are looking for.
- Risk 1: Reshaping answers to fit the proposed solution.
- Risk 2: Molding the questionnaire to receive desired answers.
- Measure: The whole team reviews the questionnaire after each revision to make sure it is not biased.
The whole team will review the final analysis to make sure that conclusions have not been shaped.

Community

- Canon: Our IPRO team will act in a respectful and truthful manner towards the Illinois Institute of Technology community.
- Pressure 1: To win in the different competitions on IPRO day.
- Pressure 2: To represent IIT in an honorable manner while among peers.
- Risk 1: Reporting false information on how our team worked together in the final presentation.
- Risk 2: Acting unprofessionally during interviews thus offending the person interviewed.
- Measure: All members will be asked to constantly review the impression of the team throughout the semester.

Personal Relations

- Canon: Each member will do their best to put forth their efforts and available time to benefit our IPRO.
- Pressure: Other classes and personal life taking precedence over the IPRO.
- Risk 1: Not showing up to class.
- Risk 2: Not finishing work by set deadlines.
- Measure: Taking attendance at each meeting.
Holding each member to their set deadlines and keeping track of any extensions.

Moral Values

- Canon: Team members will not have to compromise their moral and spiritual values during the course of the team's work.
- Pressure: Peer pressure amongst team members could keep a member from voicing their opinions on our project.
- Risk 1: Alienating a member of the team and losing their input on our project.

Risk 2: Offending someone outside of our team on an issue that a member did not speak up against.

Measure: Throughout the semester each team member will be asked how they feel the project is heading and if they have any objections or suggestions.

IPRO303:

Information Design for Plant Management to Predict Equipment Failure

Kirsten Reimann

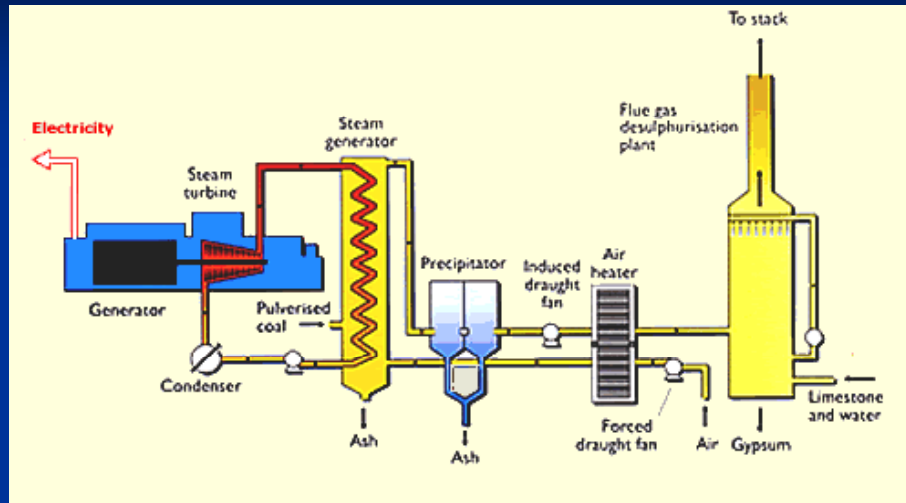
Olufemi Sonoiki



Background

- Our IPRO is based on SmartSignal's software that predicts failures in power plants.
- Software sends over a thousand warning messages relating to different parts of the plant daily.
- Resulting in information overload

Power Plant



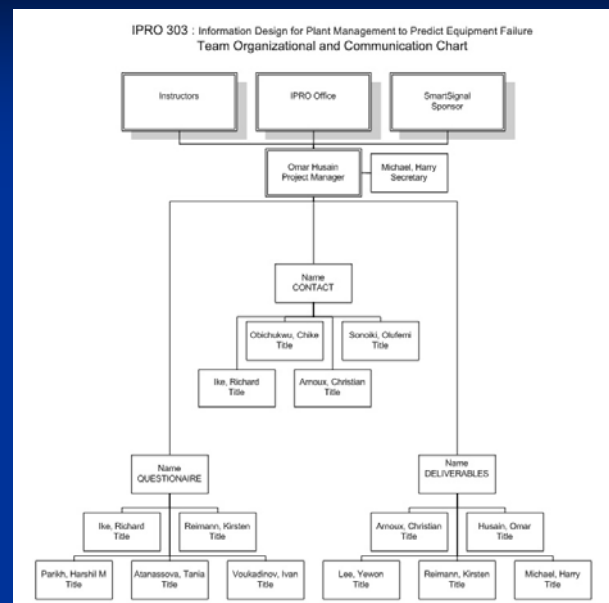
Goal

- Objective is to determine how Engineering Specialists and Shift Supervisors handle planned and unplanned maintenance.
- Compile the gathered data into a comprehensive report which should benefit the sponsor in better understanding their potential users.

Plan of Action

- Creating Questionnaire
- Contacting Power plants
- Interviewing Engineering Specialists and Shift Supervisors.
- Analyzing the data collected into a final report.

Organization of the Team



Progress Toward Goals

- Coal Fired Power Plant Presentation
- Project briefing with SmartSignal
- Spoke with past IPRO members and looked at their final report

Coming Up

- First power plant tour and interviews

Major Obstacles Encountered

- Determining team structure
 - It took us a bit longer but it set up a good base.
- Constant questionnaire redevelopment
 - We kept two students constantly working on the questionnaire.

Anticipated Major Challenges Ahead

- Finding out that our questions are mediocre after the first interviews
 - Our questionnaire team is continuing to work on a dynamic questionnaire.
- Finishing interviews by November 9th
 - Each member submitted a schedule so that the contact team can assign interviews.
- Having trouble with getting interviews
 - Our Contact group is focused on contacting the power plants during the duration of our IPRO.

Questions?