IPRO 303

Information Design for Plant Management to Predict Equipment Failure

ILLINOIS INSTITUTE OF TECHNOLOGY

BACKGROUND

• SmartSignal® corporation, the project sponsor, provides software applications that predict and monitor equipment failures in coal power plants.

PROBLEMS

• Unmanageable numbers of errors on the screen

• Warning reports not delivered to proper personnel

• Steep learning curve

OBJECTIVES

Develop a user inferace (UI) that:

• Makes information manageable

• Integrates all decision-makers at the power plant

• Makes information easily accessible and understood

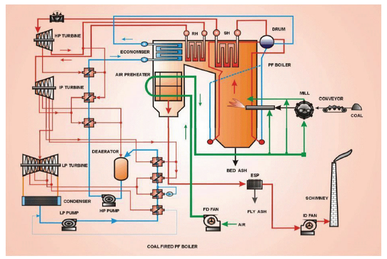
METHODOLOGY

• Research how warning information is handled in coal power plants

• Develope multiple UI concept to be reviewed by Smart Signal®

• Revise and develop the best UI concept

UNDERSTANDING THE POWER PLANT



COAL FIRED PF BOILER

Overview

• Coal power plants contain multiple interdependent systems such as turbines, boilers and coal supply

• Each system is overseen by an Engineering Specialist who schedules maintenance based on error log information

• A single control room monitors and controls plant operations

The Control Room

• Multiple computer monitors display thousands of screens and subscreens used to control different machines and processes in the plant

• Operated by several specialists with many years of experience

Communications

• Low-Level Errors: Control room operator notifies Engineering Specialists by phone or email of warnings or faults that may require maintenance

• High-Level Errors: Control room operator notifies machine operator on the floor for immediate action

Requirements for UI Design

1.0 Provide relevant information to the appropriate people with a need to know
2.0 Be easy to use
3.0 Allow for easy prioritization and maintenace planning
4.0 Provide for easy and efficient communication mechanisms among plant staff
5.0 Provide seamless flow between incident recognition, investigation and resolution action

TEAM

Research Teams

• **High Level Design**
Developed three initial conceptual approaches for the design of a UI

• **Communications**
Researched information flow in coal power plants

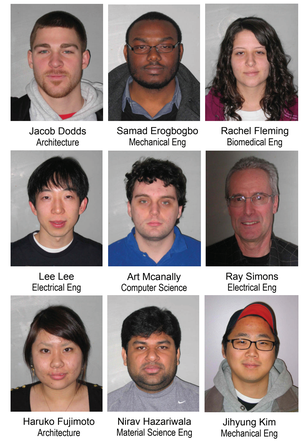
• **Fault Analysis**
Determined relationships between personnel and error priorities

UI Development Teams

• **Requirements Document**
Created document listing required attributes of final UI design

• **Design Content**
Created specifications for design and functions of the UI

• **Screenshots**
Created a visualized prototype of the final UI design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