Fall 2004 IPRO 328
Application of Solar Thermal Heating Technologies in Large Scale Buildings in the Urban Environment- Midterm
Facilities Research, Inc., Nancy Hamill Governale, AIA, CEM

PROJECT GOALS

For this IPRO, the goal is to create a heat collection system with which we heat the swimming pool of Keating Hall. The heating collection system consists of a series of evacuated tube heat collectors. These collectors will be placed in secondary structure outside the stands and dugout of the baseball field. The structure will also provide shading for the baseball stands, an enclosure for maintenance equipment, as well as a new announcer's booth. The heating collection system will also hopefully displace part of the heating and cooling load for the entire hall. There is also the possibility of the incorporation of an absorption air conditioning unit to remove part of the cooling load during the summer time. There will also be the incorporation of a pool cover to and curtain insulation to minimize heat loss.

The most prominent change from the primary objective is the more general view to a specific idea. The changes reflect the location of collectors, type of solar thermal collector, incorporation of absorption air conditioning unit.

SUMMARY OF PROGRESS

The first two weeks were spent on the following:

- Introduction to the IPRO by professor Nancy Hamill.
- The review of previous IPROs' work.
- The organization of the group into subgroups.
- Engaging in the study and research of passive solar heating technology by sub groups.
- The development of a project plan.

The next four weeks were spent on the following:

- The creation of 3D site plan for sun studies.
- The development of a project website.
- The research of pool covers that would provide protection against heat loss.
- The study of the proper heat collectors and placement for the devices on site.
- The learning and studying the ret screen program for analysis of project.

The last two weeks have been spent on:

- The development of a structure to support the heating collectors.
- The selection of the proper heat collectors.
- The studying of Energy 10 software to due more analysis.
- The schematic diagram for what equipment is need for use in the system.
- The development of the midterm report.

Enclosure Group:

The focus of the enclosure group is to design a secondary structure to which to attach the thermal collectors to. The group had to decide whether or not attach the collectors to the Keating hall structure or to a separate structure. The group decided upon a separate structure. The group then decided to place it outside the stands of the baseball field to work as a shading structure for the stands as well as storage for maintenance crew.

The Keating Hall Group:

The Keating hall group started with a focus on the pool cover as a way to maintain heat gained. At the same time began the study of the various types of solar collectors. They also looked into the other equipment that would be needed to integrate the heat collected into to the Keating hall heating system. They have also mastered the energy 10 software that will help to analyze the collected data and make predictions about energy saving of the system.

The Analysis Group:

The analysis group has been keeping track of the information collected by the other two groups taking it and putting it in to programs to calculate the potential benefits of our project. The analysis has been focusing on the website creation and maintenance. The website consists of the finished tasks of each of the groups. They have also done various ret screen tests to analyze which collectors and system which best suit the goals of the IPRO.

SCHEDULE FOR THE REST OF THE PROJECT

The group will continue to work in its three sub groups to maintain focus on the various aspects of the project. The next step is to take the finalized design and make all the drawing sufficient to illustrate its intentions to the observer. The following is a timeline proposed for the completion of this as well as the inclusion what other changes can be made to Keating to reduce its heating and cooling needs as well as applications for the rest of Chicago.

Week of 10-18-04

- Turn in midterm report
- Finalize a plan and set of elevations for the proposed structure
- The completion of the pumping needs and calculations for the pool
- A review of the ret screen tests

Week of 10-25-04

- The development of a 3D model to illustrate what the structure will look like
- The development of the attachment manifold for the evacuated tubes
- The selection of the equipment to be included in the mechanical room to incorporate heat gained from the structure.
- The creation of a cost/savings document to illustrate the benefit of the structure

Week of 11-1-04

- The development of a diagram showing all the equipment to be used to create this system
- The calculation of energy needed to run the system
- The further development of the 3D model of the structure
- The creation of a document stating projected benefits of more solar thermal use in Chicago
- The finalizing of the cost of the system document

Week of 11-8-04

- The completion of the diagram of the system
- The incorporation of the completed 3D model into images of the site
- The study of further improvements to Keating for energy use reduction.
- The creation of a document stating projected benefits of more solar thermal use in Chicago
- The creation of a document about the incorporation of absorption air conditioning into Keating hall.

Week of 11-15-04

- Assign work on final poster
- Assign work on the final report
- Assign work on the final oral presentation
- Finalize Website info
- Finish any incomplete tasks

Week of 11-22-04

- Work on final poster
- Work on the final report
- Work on the final oral presentation
- Finish any incomplete tasks
- Finalize Website info

Week of 11-29-04

- Run group practices of the oral presentation

UPDATED ASSIGNMENTS

ENCLOSURE:
Justin
Christopher Tokarz
Harsha Pannala

MECHANICAL:
Kristen Kelley
Joseph Sutalo
Jae-Sun Jeong

ANALYSIS:
Sean Huber
Rajiv Shah
Sriram Mahadevan

BARRIERS AND OBSTACLES

Though the workers of the group seem to be completing their work in a timely manner the progress has not been as quick as originally predicted. This is due to a lack of cooperation from manufacturers of the needed equipment. Though several emails have been sent to multitude of companies the response has been slow and incomplete. This is due in part to most work in calculations of this system being done at home and there appears to be a desire to keep it that way. The lack of getting hard factual information from several sources brings in to question the validity of our analysis. Though our facts do have a source it would be better to check them against several other companies for consistency. In the future it would be in the IPRO's best interest to have company that does such work with these systems as source to get information when making these kinds of predictions.