

IPRO 324 Project Plan

Spring 2007

Disaster Recovery: Do-It-Yourself Home Building

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Introduction.....	Pg. 3
Background Information.....	Pg. 3
Purpose.....	Pg. 5
Research Methodology.....	Pg. 5
Assignments.....	Pg. 6
Obstacles.....	Pg. 7
Results.....	Pg. 8
Recommendations.....	Pg. 8
References.....	Pg. 8
Acknowledgements.....	Pg. 9
Team Member Information.....	Pg. 9

Introduction:

I PRO 324, Do It Yourself: Disaster Relief, was created to aid in the recovery process following natural disasters such as Hurricane Katrina. This included creating a design for a simple multi-purpose structure with a kitchen, handicapped bathroom, and open living areas, as well as a manual detailing its construction. The I PRO hoped that, with the manual as a guide, the average individual, with minimal construction background, would be able to undertake this project should an emergency situation require it. The design according to the manual will enable the construction of a new building at a cost of approximately \$25,000.

The focus of the group for this semester was to modify and detail the original structure for construction in the specific disaster zones of the Gulf Coast according to established FEMA guidelines. This design was then used to create a comprehensive manual describing a step-by-step process for building the structure. It is hoped that this guide will aid disaster victims in starting the recovery process in a quick and efficient manner.

Background:

Under the direction of Professor Frank Flury, a team of students outside IIT previously attempted to build something similar to the intentions of this I PRO. In 2004 Professor Flury and these students built a structure for the victims of a natural disaster which turned into a very successful project. As such, Professor Flury proceeded to make two other structures in other locations. One such project was the Lynn Meadows Discovery Center, which was constructed with the volunteer efforts of IIT students who did this without school credit.

Other than the obvious reason of wanting to help disaster victims, there were many things that influenced Professor Flury to create this I PRO. For one thing, he wanted architect students as well as students from other disciplines to experience something more hands on than what they were generally accustomed to. He saw the excitement of the volunteers who had previously worked on the projects, and he wanted to bring that excitement to the students at IIT. After the successful completion of the Lynn Meadows Discover Center project, Professor Flury felt that many more successes could be accomplished, and he knew IIT students would be up to the challenge.

Our I PRO focused originally on aiding those left homeless by natural disaster, and our main goal was to provide

victims with the opportunity to build this structure almost entirely on their own, ensuring a more timely process in getting back on their feet. We envision creating a model that is simple enough that a novice could practically build it themselves, yet durable enough to last permanently if the client wishes. Though our original projected client base was those left homeless due to natural disasters, this was modified to include and focus on artists' communities and artistic studios as well. This was also an area of Gulf Coast culture that was devastated due to the hurricane. Despite efforts throughout the semester to locate a specific client, however, no conclusive contacts could be established, so this must continually be pursued by future IPRO groups.

Our plan for this semester was broken into two main parts. The Design Team took care of modifying and detailing the original structure to FEMA guidelines in the regions on which we focused. This, in some ways, presented an ethical issue because the structure could not be designed to specifications without jeopardizing our original intent of cost-effectiveness and timely construction. In the end, a compromise was established, and it was duly noted within the construction manual that the building was not designed to withstand hurricane conditions and must be evacuated in such situations.

Additionally, the manual team was designated to clearly and comprehensively explain the construction plans in a booklet which would allow for the average individual, with minimal construction background, to easily and efficiently erect the structure. One issue encountered by individuals building their own structures, however, is the need for permits and inspections and licensed trade work such as plumbing and electrical. In this case, it would have been unethical to suggest individuals perform these tasks themselves. Instead, methods to subcontracting and obtaining proper permits is discussed in the manual.

Purpose:

The Purpose of IPRO 324 was to design a simple and affordable relief structure and detail its construction in a comprehensive manual. This manual could then be used to by the average individual, with minimal construction background, to quickly and efficiently begin the relief process.

Research Methodology:

The group was subdivided into three main teams to work independently on different aspects of the project. The design team was established to continue a detailed study on the design of the original model and on how it must be modified to comply with FEMA regulations for the Gulf Coast Region. All such regulations and recommendations were found on the official FEMA website. Because these standards vary considerably from location to location, depending on proximity to the ocean, elevation, etc., the team continued under the assumption that the building would be constructed in coastal A-zones. Based on preliminary research delegated to different members of the team, it was concluded that this intermediate zone provides a good basis for and compromise of all possible zones. The design team then worked to create detailed plans and elevations of the modified building by dividing the work among members. These plans could then be used to develop the manual.

The manual team worked on the design and layout of a comprehensive booklet that could be taken on to the construction site and used as a step-by-step guide. The aim of this group was to develop an Ikea-like manual that simplified the process for a range of skill levels. The group looked at different setups and layouts of manuals to decide on one which utilized diagrams and written instruction in an efficient and easily understandable manner. Because the beginning of the semester was dedicated mostly to design work, the manual team spent much of that time looking into and designing an overall layout, along with some of the step-by-step instruction. This was done considering the specific type of information that would need to be relayed, and the conditions under which one would be utilizing the manual. It was decided that the manual would be divided into sections for each main step in construction (i.e. foundation, framing, roofing, etc.), and each section would include written instruction referring to diagrams located on the facing page, as well as a tools and materials list for that page. Once the plans for the building were completed, the manual team added relevant information and renderings to the template for printing.

The business team looked to establish contacts and secure a client within the Gulf Coast region. This was done mainly through contacts that Professor Flury had already established with previous efforts, including those involved with the Lynn Meadows Discovery Center. However, no reliable contact could be established this semester due mainly to funding restrictions. Contact with non-for-profit and local church groups was also attempted, but to little

or no avail.

Assignments:

As described above, once the initial research into FEMA guidelines and manual templates was complete, the groups could begin on creative design work for both the building plans and manual. The majority of the project was comprised of such independent creative design work. A general summary of what was accomplished is outlined as follows:

TASK	START	FINISH
BUSINESS GROUP TASKS		
Establish Mission Statement	1/29/07	1/31/07
Project Plan	1/29/07	2/16/07
Develop Template	1/29/07	1/31/07
Define Objectives	2/5/07	2/5/07
Write Project Background	2/1/07	2/2/07
Write Project Methodology	2/1/07	2/2/07
Write Expected Results	2/1/07	2/2/07
Update Schedule of Tasks with Milestones	2/1/07	2/2/07
Record Assigned Responsibilities	2/12/07	2/13/07
Research Clients	2/13/07	2/18/07
Compile Information	2/19/07	2/25/07
DESIGN GROUP TASKS		
Additional ADA req. design	2/13/07	2/18/07
Structural Consult	2/15/07	3/12/07
Finalize Construction Documents	3/18/07	3/27/07
Manual Group Tasks		

Materials of Construction	2/20/07	2/25/07
Sections, Details, etc	2/20/07	3/28/07
Graphic Organization and Writing	3/1/07	4/20/07

GENERAL TASKS

I PRO day presentation	3/26/07	4/25/07
Models and Descriptive Posters	4/14/07	4/25/07
Design and Print Booklet	3/19/07	4/20/07
Mid-Term Report	3/19/07	3/23/07
Final Report	4/19/07	4/24/07

Obstacles:

One of the biggest obstacles faced by the design team was detailing the original plans according to specific FEMA recommendations and guidelines, while still maintaining the simplicity and cost-effectiveness of structural design. This proved to be an ethical dilemma as well as a logistical one. In the end, the building was designed to be a permanent structure, but one that could not withstand future hurricane-like conditions. Therefore, a note was included in the construction manual indicating that the structure must be evacuated in such conditions.

Another issue encountered by the manual group was the assumptions that could be made in regards to the level of background necessary for the construction of the building. For the purposes of the manual, it was assumed that the individuals undertaking the project had some preliminary working knowledge in construction, even if only minimal. In the situation where permits or licensed trade work was needed, the individual is told to subcontract all work and maintain all proper condition throughout the construction process.

Barriers of clients and funding have been extremely difficult for the group. The main obstacle is in finding a client who can produce the funding for the project within the Gulf coast area. While there are many interested parties

involved, there haven't been any substantial agreements with anyone to go forward and plan a site visit. The team will continue to stay in contact with the people who are interested and are hoping that this can provide leads for future IPROs.

Results:

To date, we have completed detailed plans for the structure. This includes full construction drawings that include: a plan, foundation plan, building elevation, a section, kitchen elevation, bathroom elevation, electrical plan, and a riser diagram (for plumbing). All of these drawings are included in a manual describing the building's construction. The manual describes how to build this simple structure with step by step instructions. It breaks up the construction process into 5 components, which include the foundation, core, exterior walls, roofing, and the screen frames. With the instructions, diagrams and a glossary was given to help explain the process to the everyday person who may have little to no construction experience. Scaled models were also built according to the manual instructions to verify and demonstrate the process.

Recommendations:

It is recommended that future IPRO 324 teams work to secure a client and build relationships in the Gulf Coast region with those who may benefit from the project. Because, the design and manual have been completed, the next phase of the IPRO should focus more heavily on the business related aspects of implementing the design for practical applications. Finding alternative sources of funding or donation in order to build a full-scale mockup of the structure should also be pursued.

References:

<http://www.fema.gov>

Simpson Construction Material Co. – Product Catalogues 2007

Acknowledgments:

We would like to thank Professor Frank Flury for his continued support and commitment to this IPRO.

Team Member:

LAST	FIRST	MAJOR	TEAM	TASKS
Chacko,	Serena	BioMed Eng.	Building Manual	Manual-Graphics and Writing
Dakowisz,	Dukasz	Architecture	Construction	Manual
Diaz De Leon Orraca,	Federico	Architecture	Design	Structural Considerations
Dilger,	Andrew	Architecture	Building Manual	Manual
Dolejs,	Martina	Architecture	Business	Deliverables
Grosse,	Christopher	Architecture	Business	Research
Kim,	Jung-Jae	Computer Sci.	Building Manual	Manual
Kirsch,	Joseph	Architecture	Building Manual	Manual
Navarro,	Jonathan	Architecture	Construction	Manual
Peck,	Edward	Architecture	Design	ADA design, Manual
Ray,	Monmayuri	Architecture	Design	Manual
Rios,	Homero	Architecture	Construction	Research
Rogers,	Eric	Civil Eng.	Construction	Structural Considerations
Rotella,	James	Architecture	Construction	Structural Considerations
Thompson	Sean T.	Architecture	Building Manual	Manual-