IPRO It takes a team INTERPROFESSIONAL PROJECTS PROGRAM

IPRO 339 PROJECT PLAN

Designing Affordable Housing out of Shipping Containers for Chicago

IPRO Faculty Advisors

Michael Glynn

Blake Davis

IPRO Team Members

Bocanova, Veronica

Cheung, Yu

Couillais, Marc

Eliyahu, Haim

Fanelli, Daniel

Georieva, Ludmila

Iversen, Jennifer

Kerrigan, Michael

Luu, Dung

Miller, Justin

Olszowy, Krzysztof

Peroni, Joe

Prisic, Mladen

Rankin, Daniel

Siwek, Steven

Snyder, David

Spedale, Christopher

Univeros, Ana

Ustupska, Aneta

Villalpando, Rosagain

1. TEAM INFORMATION

A. Team member roster

1. Bocanova, Veronica
   - vbocanov@iit.edu
   - [redacted]
   - STRENGHTS: knowledge of designing structures and being able to solve any issues which come along with it.
   - NEW KNOWLEDGE/ SKILLS TO DEVELOP:
   - EXPECTATIONS:
2. Cheung, Yu
   - ycheung1@iit.edu
   - [redacted]
   - STRENGHTS: Good at math and physics; Great imagination
   - NEW KNOWLEDGE/ SKILLS TO DEVELOP:
   - EXPECTATIONS: this project could be a real business plan
3. Couillais, Marc
   - couimar@iit.edu
   - [redacted]
   - STRENGHTS: knowledge of adaptive reuse techniques, architecture, mobile architecture, and presentation skills.
   - NEW KNOWLEDGE/ SKILLS TO DEVELOP: ability to work on development projects in a group setting and gain knowledge on the detailing of shipping containers and construction.
   - EXPECTATIONS:
4. Eliyahu, Haim
   - haliyahu@iit.edu
   - [redacted]
   - STRENGHTS: leadership, problem solving, organization, member of the Material Advantage group, IPRO 339 Veteran
   - NEW KNOWLEDGE/ SKILLS TO DEVELOP:
   - EXPECTATIONS:
5. Fanelli, Daniel
   - dfanelli@iit.edu
   - [redacted]
   - STRENGHTS: Understanding of basic business principles and ideas.
   - NEW KNOWLEDGE/ SKILLS TO DEVELOP: knowledge of the inner workings of architecture.
   - EXPECTATIONS: to produce a prototype by the end of the semester.
6. Georieva, Ludmila
   - georud@iit.edu
   - STRENGHTS: team-worker, good with research and graphical representation.
   - NEW KNOWLEDGE/ SKILLS TO DEVELOP: construction detailing, urban development planning cost estimation.
   - EXPECTATIONS: to create comprehensive and realistic proposal for the residential use of the chosen units, cost and construction timetable estimates to support the proposal.
7. Iversen, Jennifer

- Jiverse1@iit.edu
- STRENGHTS: AutoCAD, design, Photoshop, model making, building research
- NEW KNOWLEDGE/ SKILLS TO DEVELOP:
- EXPECTATIONS:

8. Kerrigan, Michael
   - mkerriga@iit.edu
   - [redacted]
   - STRENGHTS: hard worker, good at thinking about the big picture, very basic engineering knowledge over a broad area
   - NEW KNOWLEDGE/ SKILLS TO DEVELOP:
   - EXPECTATIONS:
9. Luu, Dung
   - luudung@iit.edu
   - [redacted]
   - STRENGHTS: knowledge of Architecture.
   - NEW KNOWLEDGE/ SKILLS TO DEVELOP: learn to work in a team and improve research skills
   - EXPECTATIONS: having a successful IPRO, this will have a positive impact on the Chicago Olympics 2016, and the future.
10. Miller, Justin
    - Jmille28@iit.edu
    - [redacted]
    - STRENGHTS: Sustainable design, Sustainable technology, research and presentation skills. ASQ 6 Sigma Certified in Business and Industrial process.
    - NEW KNOWLEDGE/ SKILLS TO DEVELOP:
    - EXPECTATIONS:
11. Olszowy, Krzysztof
    - kolszowy@iit.edu
    - [redacted]
    - STRENGHTS: patient, detail oriented, inventive.
    - NEW KNOWLEDGE/ SKILLS TO DEVELOP: communication, public speaking, presentation
    - EXPECTATIONS: to be able to effectively communicate in a business like fashion with people of different professions
12. Peroni, Joe
    - jperoni@iit.edu
    - [redacted]
    - STRENGHTS: Experience in design and typical construction methods, model making, problem solving, AutoCAD, Photoshop, 3ds max
    - NEW KNOWLEDGE/ SKILLS TO DEVELOP: to develop my communication and presentations skills
    - EXPECTATIONS: To have a fully developed project that is ready for construction
13. Prisic, Mladen
    - mprisic@iit.edu
    - [redacted]

- STRENGHTS: advance knowledge in transportation industry, management skills, complex computations, firsthand experience in reinforced concrete and masonry objects, AutoCAD drawing
- NEW KNOWLEDGE/SKILLS TO DEVELOP: to improve my knowledge of HVAC installations, my communication skills and to explore other fields in engineering
- EXPECTATIONS: I think that this project has great potential for the city of Chicago and I am looking forward to be part of the team

14. Rankin, Daniel
    - drankin1@iit.edu
    - [redacted]
    - STRENGHTS: Ability to understand buildings - both in terms of the big picture and small details. Some familiarity with codes, zoning, and programming. Lots of experience using AutoCAD, VIZ / 3ds, and Photoshop.
    - NEW KNOWLEDGE/ SKILLS TO DEVELOP: more exhaustive understanding of how a building works (materials, methods of construction, MEPFP, programming, etc), learn about building codes and zoning. Also, learn how to use Adobe Illustrator.
    - EXPECTATIONS: The end of the semester for the project to be at a level of development where it could be pitched as a feasible idea to the city and to developers.

15. Siwek, Steven
    - ssiwek@iit.edu
    - [redacted]
    - STRENGHTS: Experience as a communication specialist and ability to work with a wide range of SME's
    - NEW KNOWLEDGE/ SKILLS TO DEVELOP: More efficient use of time when meeting with SME's and working on getting information gathered and organized.
    - EXPECTATIONS: strong coordinated efforts by all sub teams to work together so the goal of this semesters work is realized.
16. Snyder, David
    - dsnyder2@iit.edu
    - [redacted]
    - STRENGHTS: Technical Mindset, with an attention to detail and a strong emphasis on functionality
    - NEW KNOWLEDGE/ SKILLS TO DEVELOP: the ability to bring together the unique capabilities of varying disciplines to accomplish a complex, real-world task.
    - EXPECTATIONS: to broaden my appreciation for the capabilities of a multi-disciplinary team.
17. Spedale, Christopher
    - cspedale@iit.edu
    - [redacted]
    - STRENGHTS:
    - NEW KNOWLEDGE/ SKILLS TO DEVELOP:

- EXPECTATIONS:

18. Univeros, Ana
    - untiana@iit.edu
    - [redacted]
    - STRENGHTS: ability to produce advanced architectural drawings, with the information gained through traveling and maintaining an interest in practical architectural issues.
    - NEW KNOWLEDGE/SKILL S TO DEVELOP: ability to work productively in a team with very diverse majors.
    - EXPECTATIONS: to gain knowledge about shipping container housing & related issues concerning its marketing, structure & functioning.
19. Ustupska, Aneta
    - austupsk@iit.edu
    - [redacted]
    - STRENGHTS: management and organization skills, previous marketing experience, AutoCAD & MathCAD experience.
    - NEW KNOWLEDGE/ SKILLS TO DEVELOP: better understanding of the construction and planning process, as well as gain the ability to productively work in a diverse team.
    - EXPECTATIONS: to be an asset to the group, gain knowledge about architecture, and have a successful IPRO.
20. Villalpando, Rosa
    - villros@iit.edu
    - STRENGHTS: AutoCAD, Photoshop, Illustrator, 3D modeling, past experience in this IPRO (Fall 2008)
    - NEW KNOWLEDGE/ SKILLS TO DEVELOP: Organizational skills, time-management
    - EXPECTATIONS: I would like to see this project become a design-build and be presented to the Olympic Committee.

B. Team Identity

1. Name: “Housing in a Tin” IPRO 339
2. Logo:

3. Motto: “Do not go where the path may lead, go instead where there is no path and leave a trail”.

2. TEAM PURPOSE AND OBJECTIVES

A. Team Purpose

The City of Chicago has been nominated as the U.S. Bid City for the 2016 Olympic Games. If Chicago was to win the honorable tile of the Host City, one of the main challenges that the organizers will face is to provide a temporary housing for all athletes, organizers, media and spectators involved. While the athletes, coaches and other major players will be situated in Olympic village, thousands if not millions of others, will face the challenge of seeking the affordable housing for the length of stay. Our IPRO proposes economical and environmentally friendly solution to this problem. We propose to utilize thousands of old shipping containers that are abundant in Chicago area and to convert them into housing objects. These second hand products will be modified and equipped with electrical, plumbing and HVAC installations, making them aesthetically and functionally comparable to similar conventional housing objects. Following the completion of the Olympic Games, these housing containers could be easily converted into affordable permanent housing for the residents of the Chicago South side. This will allow local residents

to benefit from higher quality affordable housing without being forced to relocate from their neighborhoods. Considering that housing accommodations in Chicago during Olympics will be highly priced most of the construction costs can be covered in this manner. Our IPRO hopes to make esthetically appealing and practical permanent housing out of materials that can be recycled twice: first from the shipping containers and second from the Olympic Housing. We also plan to explore particular needs of temporary residents during Olympics and later permanent residents as well as to explore what would be the most effective transformation methods from one purpose to the other. These housing objects must appeal to many people from different cultural backgrounds, and provide them with good living conditions for a short period of time. Also, we must investigate what makes affordable housing possible and what are the mistakes that the City of Chicago made in the past with similar projects. These housing structures must be fully functional for the future permanent residents, but they also must be designed in accordance with rules and regulations by the City of Chicago Department of Buildings so that they are safe and aesthetically appealing for all of the other local residents. In conclusion, the container housing is an affordable and environmentally friendly solution to housing needs of numerous individuals involved in the Olympic events while it also provides a long term housing opportunity for the residents of the local community.

B. Objectives:

- Research previous usage of shipping containers for purpose of building housing objects.
- Modify the proposal of the previous IPRO group so that the housing developed can be utilized for dual purpose of providing temporary and permanent housing.
- Determine the most efficient way to convert these objects from temporary housing used for Olympic Games to permanent affordable housing for local residents.
- Explore possible technical solutions for structure of façade and ensure successful implementation into urban Chicago environment.
- Research the most cost efficient and sustainable ways of incorporating plumbing, HVAC, and electricity into these objects.
- Explore possibilities aimed to increase energy efficiency of the housing in cost efficient ways.
- Use our prototypes to implement our solution to other places around the world.
- Ensure civic and handicap accessibility for the housing

3. BACKGROUND

A. Our customer is the City of Chicago and Olympic Committee for whom housing will be developed initially as well as the non-profit housing organization for whom the permanent housing will be created for long term use.

B. We plan to use shipping containers to create housing objects for two different types of residents (temporary vs. permanent) and therefore we may be faced with issues arising from different needs and expectations of two socio-economic groups. The visitors that will occupy these housing objects during the period of Olympic Games must be satisfy with proximity of the housing objects to the Olympic events, accessibility to public transportation and overall comfort. On the other hand, the permanent residents that will occupy these housing objects following the completion of Olympic Games must find these housing objects affordable, functional and aesthetically appealing. Therefore, the housing objects must be design to meet the needs of all. The City of Chicago and its officials have failed to develop the permanent housing objects for people in need time and time again, resulting in many that are left homeless. The paucity of affordable housing solutions available for the residents of the City of Chicago has forced numerous people to either relocate or to move to the streets. In order to ensure that our attempt to develop affordable social housing doesn't face the same fate as numerous others projects have in the past, we must take extra care in making sure that our housing objects fit into the typical Chicago lot and that they resemble the architecture and character of neighboring homes.

C. Previous attempts to design public housing had limited success and it resulted in various social problems that led to increase in crime incidences, segregation from the rest of the community and dependency of many on the government for income. Robert Taylor Homes (demolition finished 2007) and Cabrini-Green (demolition nearly complete) are the most notorious examples of failed housing projects that we can find in the City of Chicago. Many problems are the prodigy of socio-economic isolation that residents of the housing projects face. To avoid previous mistakes in the future, we must integrate these individuals into communities that are already well functional and provide the new residents with housing solutions of wide range of affordability. The city of Chicago offers good environment for our project because of its close proximity of advance communities and socially and economically isolated neighborhoods that are in need of better quality housing. Land acquisition will be one of the biggest challenges that we can face. We would favor to use city owned land that is available because it is more affordable than the land available at the market price. The use of the city owned land would be beneficial to the city itself as we create affordable

housing for number of its residents. Unfortunately, the process of acquisition of the land and obtaining license to build is no simple task and this process can take up to eight months. This process can be however expedited if the project is LEED gold certified and we propose to modify the last groups design to take this in consideration. We also face numerous other challenges that we need to circumvent in order for this project to be success. We need to develop the means to (i) easily and affordably transform the temporary Olympic housing into permanent housing structures, (ii) maintain the minimum of 7'6'' clearance when container inside dimensions are only 7'10'', and (iii) to make the project appealing to the groups that it targets.

D. Our team has a goal to develop solutions for one particular problem and that is easy transformation of the object from temporary housing for Olympic Games to permanent housing for local residents. This conversion should be processed in cost efficient way while taking in considering needs and expectations of different socio-economic groups.

E. Even today, many of the shipping containers housing objects are constructions made of single or only few units. Also there are numerous examples of utility or special purpose objects. Affordable housing is in high demand all over the world but examples of large scale shipping container structures are fairly rare. One exemption is Keetwonen, the student housing project in Amsterdam, Netherlands which is made of 1000 units and is a great example of large scale project. It was initially meant to last only 5 years and to get relocated afterwards that but it is expected that repositioning will be postponed until 2016. Regardless initial skepticisms quality of the object is outstanding and offers list of amenities that often fail in other student dormitories. Temporary housing, company behind this project, is also working on 4 star hotel in Nigeria (still under construction) and similar student housing projects in Diemen, Netherlands (still under construction) which is composed of 250 containers.

4. TEAM VALUES STATEMENT

A. Desired behaviors:

- Give 100% effort
- Work as a team to achieve shared goals
- Be on time to all the meetings
- Communicate clearly and effectively
- Respect all team members and their ideas
- Resolve issues in an effective manner
- Perform assigned tasks

- Ask for help if needed
- Meet deadlines
- Use resources wisely

B. How to address problems

- Follow the chain of command: 1st try to resolve the problem within the subgroup, 2nd if needed ask other IPRO group members for advice, 3rd if not able to get anything resolved contact IPRO instructors.
- No-shows/ incomplete tasks need to be recorded and addresses personally, if not improved then reported to the instructor, in order to avoid any delays in the project.
- Resolve problems with time conflicts within individual subgroups on personal basis.
- Report time conflicts with weekly meeting to the instructor with a one week notice.

5. METHODOLOGY/BRAINSTORM/WORK BREAKDOWN STRUCTURE

A. Design, create, and market affordable and sustainable housing for the city of Chicago using recycled shipping containers, while resembling Chicago vernacular housing.

B.

- Research the most cost efficient and sustainable ways of incorporating plumbing, HVAC, and electricity into the homes.
- Develop additional site plans, floor plans, and sections as different solutions and options to the previous semesters work by developing design solutions to the problems of solar gain minimization, water collection, optimizing site orientation, and enhancing thermal zones.
- Using our research and previous designs to continue to develop multiple solutions to satisfy the needs of the potential client.
- Using our prototypes to implement and focus our solution for both Olympic housing and the transition to an affordable Chicago multi-unit structure.
- Research a viable and cost effective energy solution
- Make the housing compliant with Chicago fire code guidelines and investigate the ethical responsibilities of further Fire Protection.
- Ensure civic and handicap accessibility for the housing.
- Incorporate the climatic needs of the Chicago region into the site design.

To go about solving the above subtasks of the overall problem, our team will be divided into groups to work on individual tasks. The individual tasks will be categorized, and one category given to each subgroup. All design goals should be completed within the given timeframe, but the ultimate construction of the housing unit will require additional time and resources.

C. Potential solutions will be tested using computer-aided design software, and mathematical computation, to be performed by the appropriate subgroup.
D. All findings will be transparently posted using the IGroups system, to be reviewed by other members of the subgroup, as well as the overall design team.
E. Results will be subjected to professional review by outside sources, such as licensed professionals and government officials. These third-party individuals will be contacted by members of the subgroups before the finalization of the design to ensure all project requirements have been met.
F. One or more representatives of each subgroup will meet with the lead instructors to complete each deliverable in the required timeframe. They will meet outside the regular class period, and will be responsible with the task of organizing pertinent information and structuring the deliverable file per its requirements. One or more representatives of each subgroup will meet with the lead instructors to complete each deliverable in the required timeframe. They will meet outside the regular class period, and will be responsible with the task of organizing pertinent information and structuring the deliverable file per its requirements.

6. EXPECTED RESULTS

Level 1: Affordable Shipping Container Housing

Level 2:

1.1-1. Construction Costs / Project Financing
1.1-2. Container Fabrication / Construction
1.1-3. Land Acquisition / Zoning / Permits
1.1-4. Marketing / Aesthetics

Level 3:

1.1- Construction Costs / Project Financing
- 1.10- Itemize material costs
- 1.11- Estimate construction labor costs
- 1.12- Estimate permitting costs
- 1.13- Estimate rezoning and land acquisition costs
- 1.14- Anticipate other related expenses
- 1.15- Develop a project financing plan
- 1.16- Research sources of financing, both private and corporate
- 1.17- Secure financing

1.2- Container Fabrication / Construction
- 1.20- Finalize energy model
- 1.21- Research and finalize HVAC system
- 1.22- Modular equipment and visit RV installation plant
- 1.23- Finalize unit floor plan and site layout

1.24- Research radiant flooring system
1.25- Further investigate passive systems
1.26- Finalize solar orientation on site
1.27- Develop and finalize construction documents

1.3- Land Acquisition / Zoning / Permits
1.30- Determine necessary type of lot zoning
1.31- Investigate rezoning process, if necessary
1.32- Ensure design complies with zoning ordinances
1.33- Research City of Chicago fast track green permitting
1.34- Acquire appropriate building permit for construction
1.35- Ensure availability of proposed housing location and secure site for construction
1.36- Make appropriate design considerations to obtain LEED gold certification
1.37- Contact Alderman for assistance with permitting and land acquisition

1.4- Marketing / Aesthetics
1.40- Create a course of action to promote the project to the community, government officials, and financial institutions
1.41- Define a positive, identifiable image for the project
1.42- Devise incentive in terms of salability
1.43- Devise incentive in terms of sustainability
1.44- Research methods of incorporating the vernacular
1.45- Research and finalize a building façade

7. PROJECT BUDGET

Item	Price	QTY	Price	Purpose
Models	$25.00	2	$50.00	Developing prototypes of our designs for review and further study.
Printing	$5.00	10	$50.00	Printing of renderings, floor plans, site plans for in class presentations
IPRO day	$250.00	1	$250.00	Poster and presentation materials (Including models)
Total:			**$350.00**	

8. SCHEDULE OF TASKS AND MILESTONE EVENTS

	Start	end
1) IPRO Deliverables	1/23/09	5/08/09
2) Project Plan	1/23/09	2/06/09
3) Midterm Presentation Preparation	1/23/09	3/02/09
4) IPRO Day Preparation	1/23/09	5/01/09
5) Exhibit/Poster	1/23/09	4/27/09
6) Abstract/Brochure	1/23/09	4/27/09
7) Final Report	1/23/09	5/8/09
8) Teamwork Product	1/23/09	5/7/09
9) IKnow Updates	1/23/09	5/5/09
10) IPRO Day	5/1/09	5/1/09
11) Project Plan Due Date	2/6/09	2/6/09
12) Midterm Presentations	3/2/09	3/2/09

	Start	End
1)**Construction Costs/Project Financing**	**1/23/09**	**5/01/09**
1.1) Research Phase	1/23/09	5/01/09
1.2) Prototype-Cost estimate	1/23/09	4/30/09
1.3) Search for funding	1/23/09	4/30/09
1.4) Finalize costs and financing	1/23/09	5/01/09
2) Container Fabrication/Construction	**1/23/09**	**5/01/09**
2.1) Research Phase	1/23/09	5/01/09
2.2) Develop Prototype	1/23/09	4/29/09
2.3) Construction sections-model	1/23/09	4/28/09
2.4) Finalize construction method	1/23/09	5/01/09
3) Land Acquisition/Zoning/Permits	**1/23/09**	**5/01/09**
3.1) Research Phase	1/23/09	5/01/09
3.2) Organize appropriate paperwork	1/23/09	4/29/09
3.3) Finalize details	1/23/09	5/01/09
4) Marketing/Aesthetics	**1/23/09**	**5/01/09**
4.1) Research Phase	1/23/09	5/01/09
4.2) Develop marketing schemes	1/23/09	4/29/09
4.3) Finalize marketable product	1/23/09	5/01/09

9. INDIVIDUAL TEAM MEMBER ASSIGMENTS

A. Group Leaders / Veterans

It is the responsibility of the group leaders to steer the subgroups toward the given ipro objectives and to assure that said goals will be accomplished within the semester timeline. Team members in this group have demonstrated strong communication skills as well as leadership fundamentals.

Yu Cheung
Haim Eliyahu
Joe Peroni
Christopher Spedale

B. Aesthetics / Marketing

This team will spend time determining the target market of the container project and studying various ways to market the idea to investors as well as the potential end user. Group members have strong marketing skills and posses a valuable set of design skills.

Daniel Rankin
Ana Untiveros
Aneta Ustupska

C. Land Acquisition / Permits / Zoning

The members of this team will be responsible for all things related to the placement of the container project on site. This includes but is not limited to working with officials to speed zoning changes, acquire land, and obtain needed permits for the progress of this project. Team member have great organization skills and ability to read architectural drawings and maps.

Dung Luu
Justin Miller
Steven Siwek
David Snyder

D. Container Fabrication / Construction

Building with containers is a relatively new endeavor and therefore requires a significant amount of research into the details and construction methods necessary to construct such a project. Team members have a strong set of design tools and are capable of creatively solving problems of structure and construction.

Ludmila Georgieva
Jennifer Iversen
Michael Kerrigan
Krzysztof Olszowy
Mladen Prisic

E. Construction Costs / Project Financing

In order to build a building, one must first obtain financing and therefore have knowledge of the project costs. This team will aim to price the project as accurately as possible as well as search for the alternative means of

financing. This team consists of members strong in math and financing with knowledge of alternative funding possibilities.

Veronika Bocanova
Marc Couillais
Daniel Fanelli

10. DESIGNATION OF ROLES

Minute Taker: records decisions made during meetings, including task assignments or changes under consideration.

· **Agenda Maker:** creates an agenda for each team meeting, which provides structure to the meetings and offers a productive environment.

· **Time Keeper:** is responsible for making sure meetings go according to the agenda.

· **Weekly timesheet collector/summarizer:** responsible for collecting weekly timesheets from each member of the team and updating everyone with a summary report.

· **Master schedule maker:** responsible for collecting schedules from all the team members and developing a master schedule, this tells the team when members are available and how to contact them.

· **iGroups:** responsible for organizing the team's iGroups account and ensuring that it is used properly.