

*Conversion of an Abandoned
Offshore Oil Drilling Rig
Platform into a Yacht Club/
Conference Facility*

Christopher W. LaMar

***Conversion of an Abandoned Offshore
Oil Drilling Rig Platform into a Yacht Club /
Conference Facility.***

c. 1996 Christopher W. La Mar

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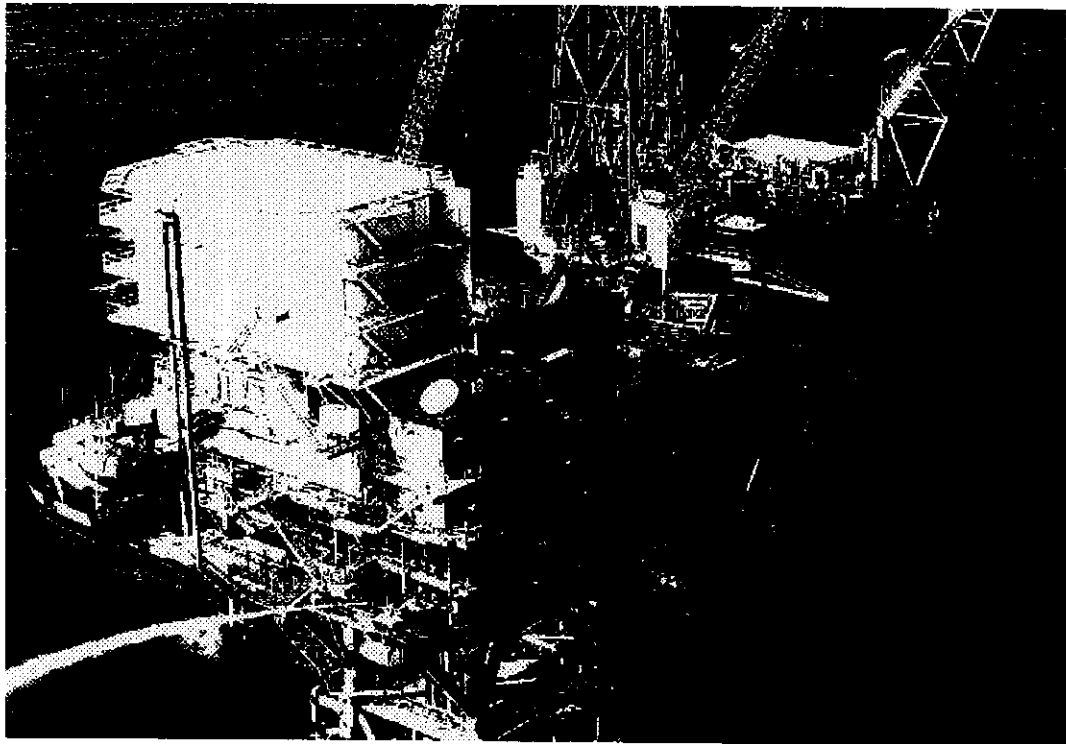
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I would like to extend a special thanks to Jack, Michel, and Carlos for their time, ideas, and encouragement. I would also like to thank the oil company that sent me the much appreciated rig drawings and other materials. In addition, I would like to thank the numerous yacht clubs along Lake Erie for generously allowing me to tour their facilities in preparation for this project.

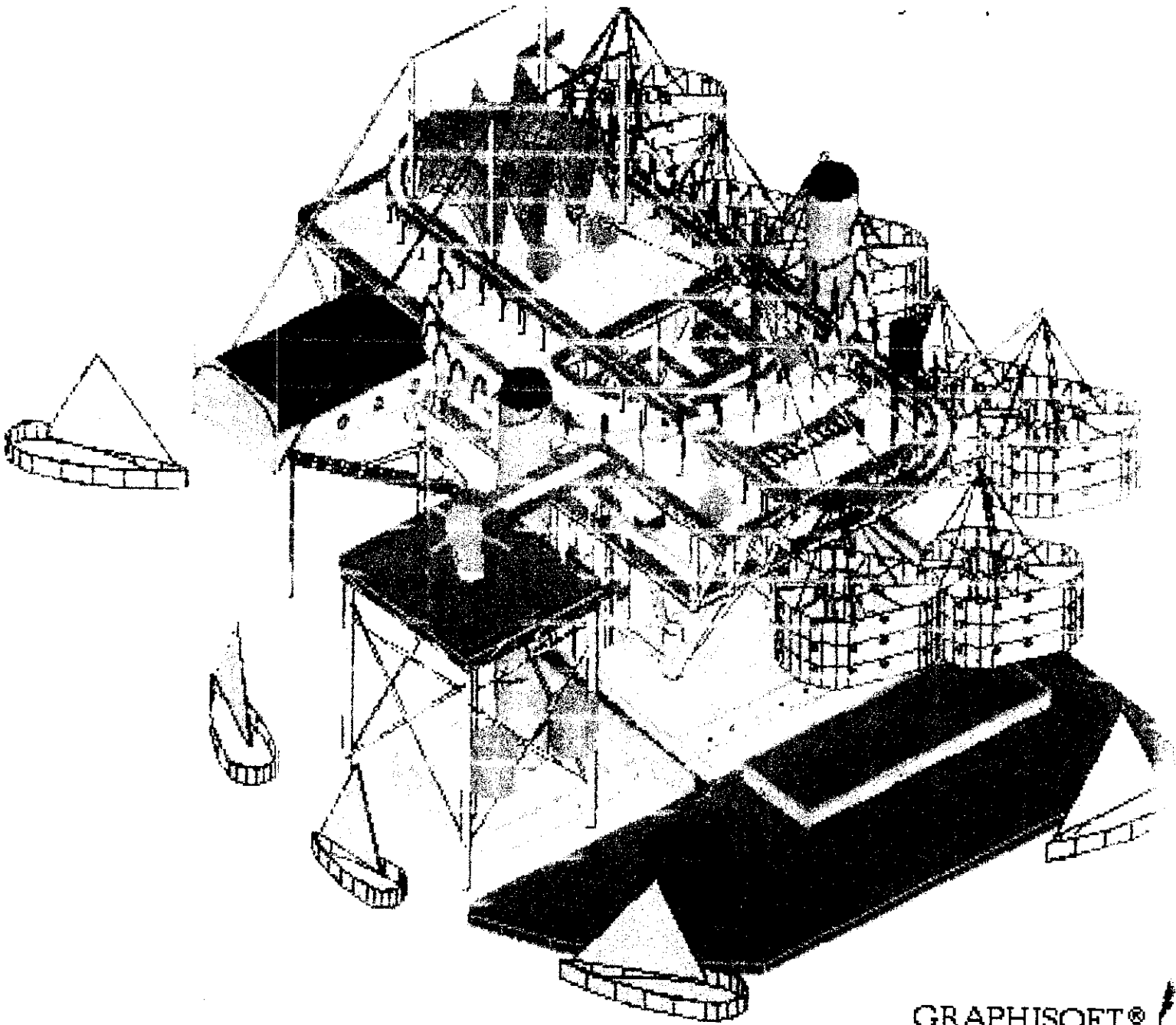
Abstract

The author of this document has chosen to explore the architectural area of adaptive reuse by converting an abandoned offshore oil drilling rig platform into a yacht club / conference facility. This document gives a general description of the facility's design precedents and major issues which were focused upon for this study, as well as a description of the final design for such facility. The location of the existing oil drilling rig is described in terms of location and numerous site conditions which effect the structure's design. This document provides a basic description of how services and utilities are currently delivered to the remote site and ideas for delivering to the new facility. Designing a structure in the middle of the ocean requires a very different approach than most architects are accustomed to. This thesis book describes how the author educated himself to better understand the oceanic environment where offshore oil rigs are located. In turn, used this information to design a sustainable facility for the hostile environment. Overall spatial relationships and approximate square footages are provided as are a summary of the spaces which is comprised of a listing of spaces and their square footages.



Axonometric view of the actual offshore oil drilling rig platform which the author chose to adaptively use (picture taken while rig was in full operation.)

Axonometric



GRAPHISOFT®

Aerial isometric of proposed Yacht Club / Conference Facility from the southwest.

Thesis Statement, Positions, and Implications.

Thesis Statement:

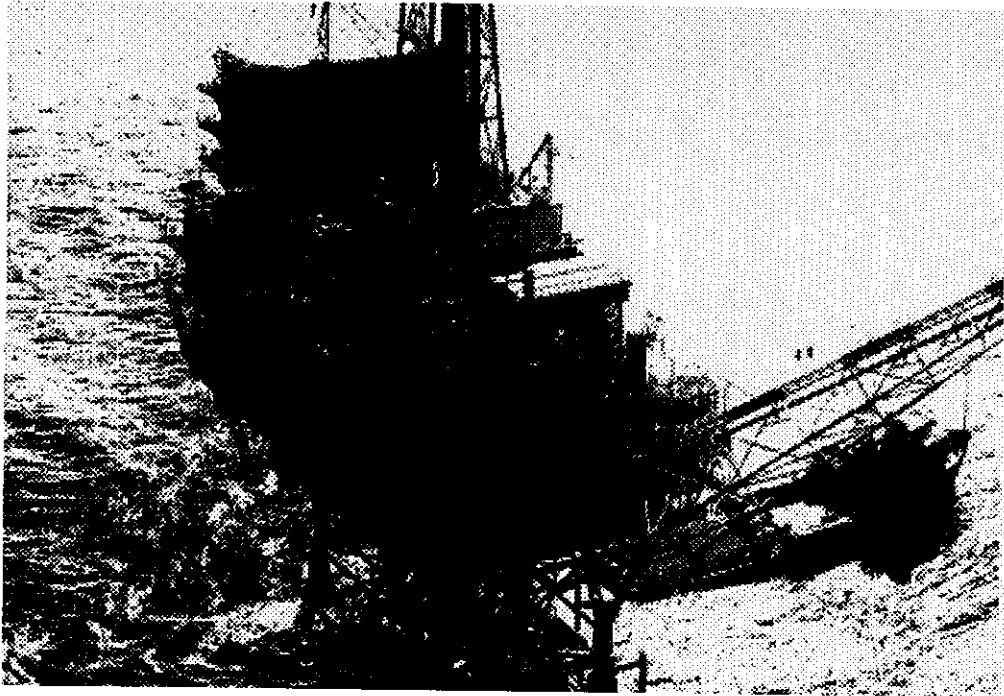
Abandoned offshore oil drilling rigs can and should be adaptively used for structures such as yacht clubs and conference facilities.

As a future architect, I feel that as environmentally responsible designers we should devote more time and study towards adaptively using as many vacant structures as is feasibly possible. Too many architecturally significant, structurally sound buildings are rapidly becoming abandoned while poorly constructed new buildings are rapidly being erected in their place. I feel that architects today are not displaying enough creativity and are choosing to create totally new designs rather than incorporating existing structures to meet the programmatic needs of a new user.

In order to prove that offshore oil drilling rigs can and should be adaptively used for other functions, I must prove that this type of undertaking can be feasibly carried out. The feasibility of this project will have to be studied from several viewpoints. I plan to start by researching any similar studies or adaptive uses for offshore oil drilling rig platforms that have already taken place. I also will study various existing yacht club / conference facilities to observe how they are designed and operate.

Since the offshore oil drilling rig platform I am adaptively reusing is located out in the Gulf of Mexico, I will have to study the effects of hurricanes and see what possible ways I can avoid their damaging effects (or at least provide immediate safety for the users of my facility.) Delivery of goods and services to the structure will have to be accommodated for in my study. For this section I can find out how goods and services are currently being delivered to offshore oil drilling rigs. I will also need to study potential energy sources to power the rig in its new use. Obtaining fresh water and disposing of waste and garbage will also have to be addressed through my project. By studying each of these subject areas individually, I can incorporate them together into my design for creating a yacht club / conference facility out of an existing offshore oil drilling rig platform.

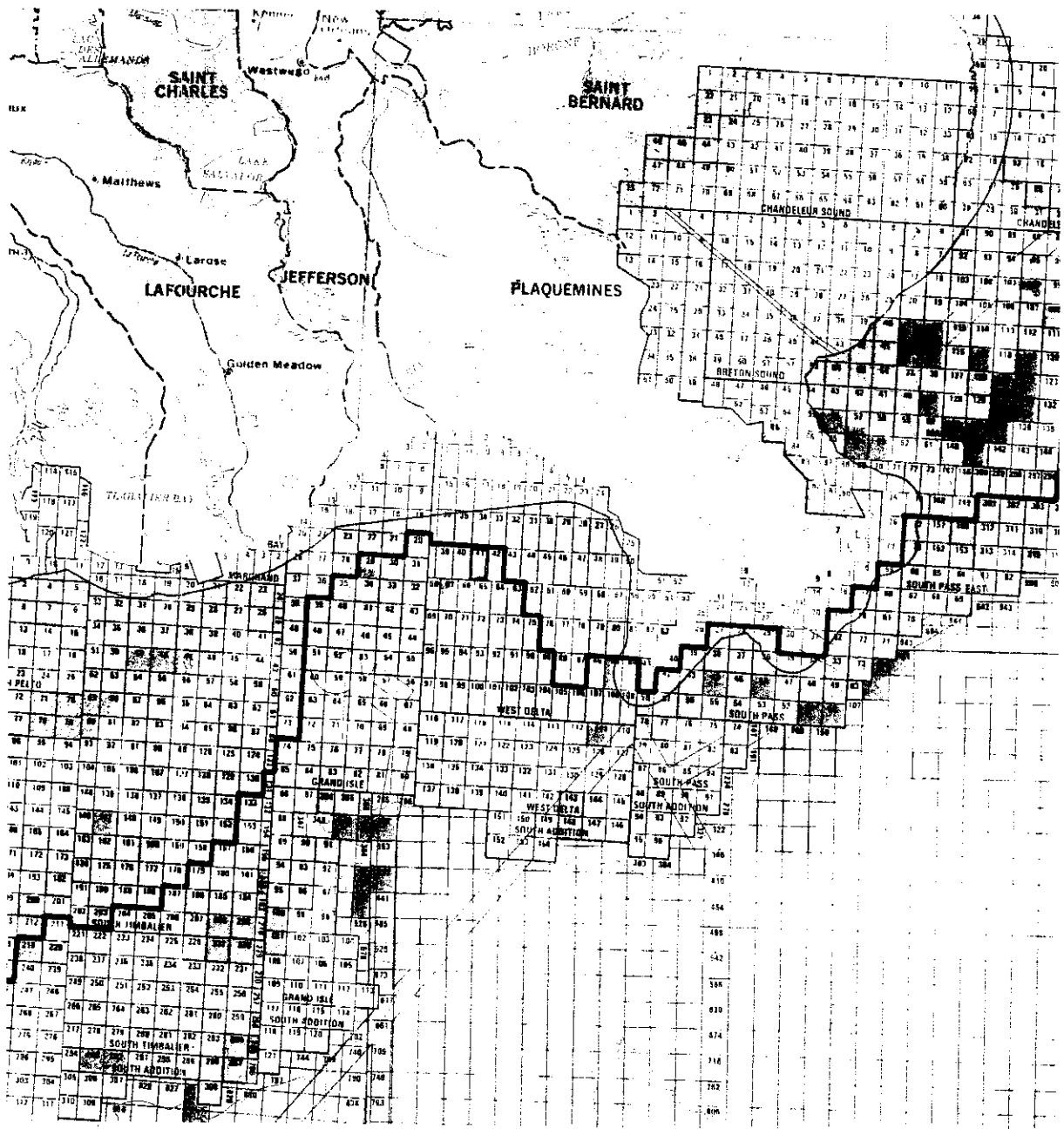
Site Analysis and Conclusions



The site where the oil rig platform is located which I have chosen to adaptively use, is in the Gulf of Mexico near Louisiana. It is approximately 150 miles south of New Orleans in the West Bay area. The nearest land to this particular oil drilling rig platform is approximately 13 miles to the east. At this platform's particular location, boat traffic moves in a diagonal fashion headed towards the northwest or southeast. Warm wind currents in this region blow from the southeast. The water depth in this part of the Gulf is relatively shallow, around 30' +/- . The average rainfall in this region is near 60 inches per year. The temperatures in this region range from 50 degrees F. in January to hot July temperatures which are well into the 90's if not above. This narrow yearly temperature range indicates that a facility such as the one proposed could be enjoyed throughout the year except for the months of December through February.

I feel that the exciting location of this site near New Orleans at the mouth of the Mississippi River would make this an ideal location for a yacht club / conference facility. Since it is located 13 miles from the shore, this location would be within an easy sailing distance for people wishing to visit the facility via sailboat. It would also be in close enough proximity to land so that supplies could easily be delivered from land. It would be possible for workers to commute to the platform from land or live on the platform and work in shifts. Furthermore, I feel that this site's location in the heart of the Gulf of Mexico would attract boat owner's from all parts of the Gulf as-well-as numerous seminars from across the United States.

Map of Gulf of Mexico Lease Spaces



This map shows lease space divisions throughout the Gulf of Mexico which are controlled by the United States Department of the Interior.

Research Review and Conclusions

The research which I applied towards adaptively using an offshore oil drilling rig platform for a Yacht Club / Conference Facility was much more extensive and complex than I had originally expected it to be. First, I researched several existing yacht clubs along the Atlantic Coast. During the Fall of 1995, in preparation for this project, I toured yacht clubs along the shores of Lake Erie. At this time I was planning on designing a yacht club / marina facility similar to those which we are currently accustomed to. I did not come up with the idea of adaptively reusing an existing offshore oil rig drilling platform until later that Fall. Still, touring existing yacht club facilities made me aware of the elements that I did and didn't want to include in my design.

Fortunately, I was able to make contact with two construction managers from one of the larger U.S. oil companies. I discussed my project with each of them. At my request, the construction manager generously sent me several sets of offshore oil drilling rig platform designs and an information package about the prefabricated structures currently used on rigs to familiarize myself with. I later chose one of these platforms to adaptively redesign through my thesis project.

The main research for this project focused on the following areas which each have a direct effect on offshore oil drilling rig platforms:

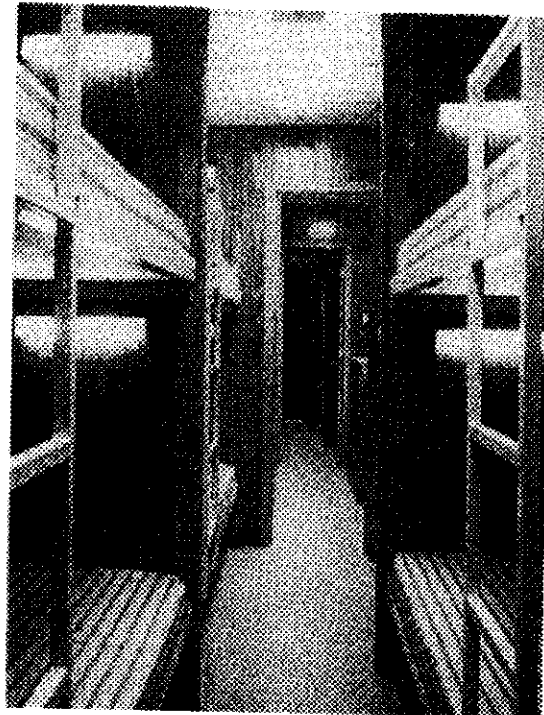
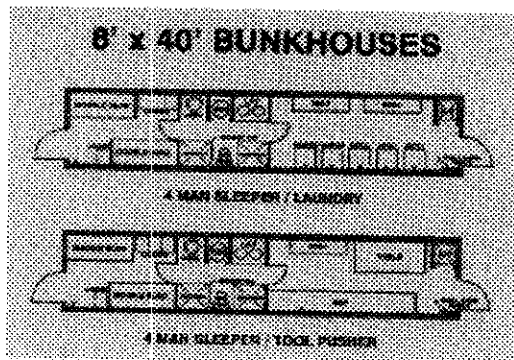
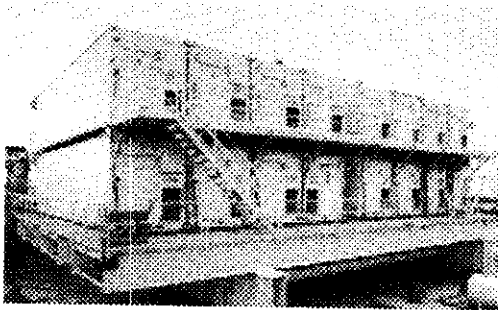
- hurricanes and storm safety
- delivery of goods and services to a remote location
- sustainable energy supply for the facility
- fresh water supply
- disposal of raw sewage and garbage
- potential for growing plants in this environment
- boat docking (keeping tidal changes in consideration)
- dealing with a relatively small amount of flat deck surface
- using materials which are sustainable to the harsh sea environment
- dealing with the psychological issues associated with visiting such a facility
- designing with an existing structural system

As one can see from viewing the above list, the areas of research incorporated into this project were very diverse and numerous. Several possible solutions were studied and considered for each of these areas.

After studying the hazardous effects of hurricanes, I felt that I really could not design my facility to resist the potential damaging forces of a hurricane. I feel that the best sure way to avoid hurricane forces is through evacuation. If hurricanes would be present in the Gulf of Mexico, I would imagine that this facility would be temporarily shut down and visitors would be evacuated and returned to land. Delivery of goods and services would have to take place by either boat or helicopter. My facility design can be supplied by either boat or helicopter. Finding an energy supply which would best provide power for a number of users on an offshore oil drilling rig

was very challenging. Electricity for the facility could be created via generators powered by gas or possibly remaining oil which could be pumped from the wells. Energy could also be supplied via solar power or wind power. Due to the humid atmosphere in the Gulf of Mexico, I opted not to pursue solar energy further. However, wind power would be an excellent source of energy for this facility which is located in a windy area. Wind power would require a backup energy source.

The disposal of raw sewage for this facility could take place through a composting treatment system which would produce fertilizer that could be used to help grow plants about the rig. The disposal of trash could take place through compact incinerators which convert waste into heat energy. Such highly sophisticated incinerators are now popular in Europe as a method of garbage disposal.

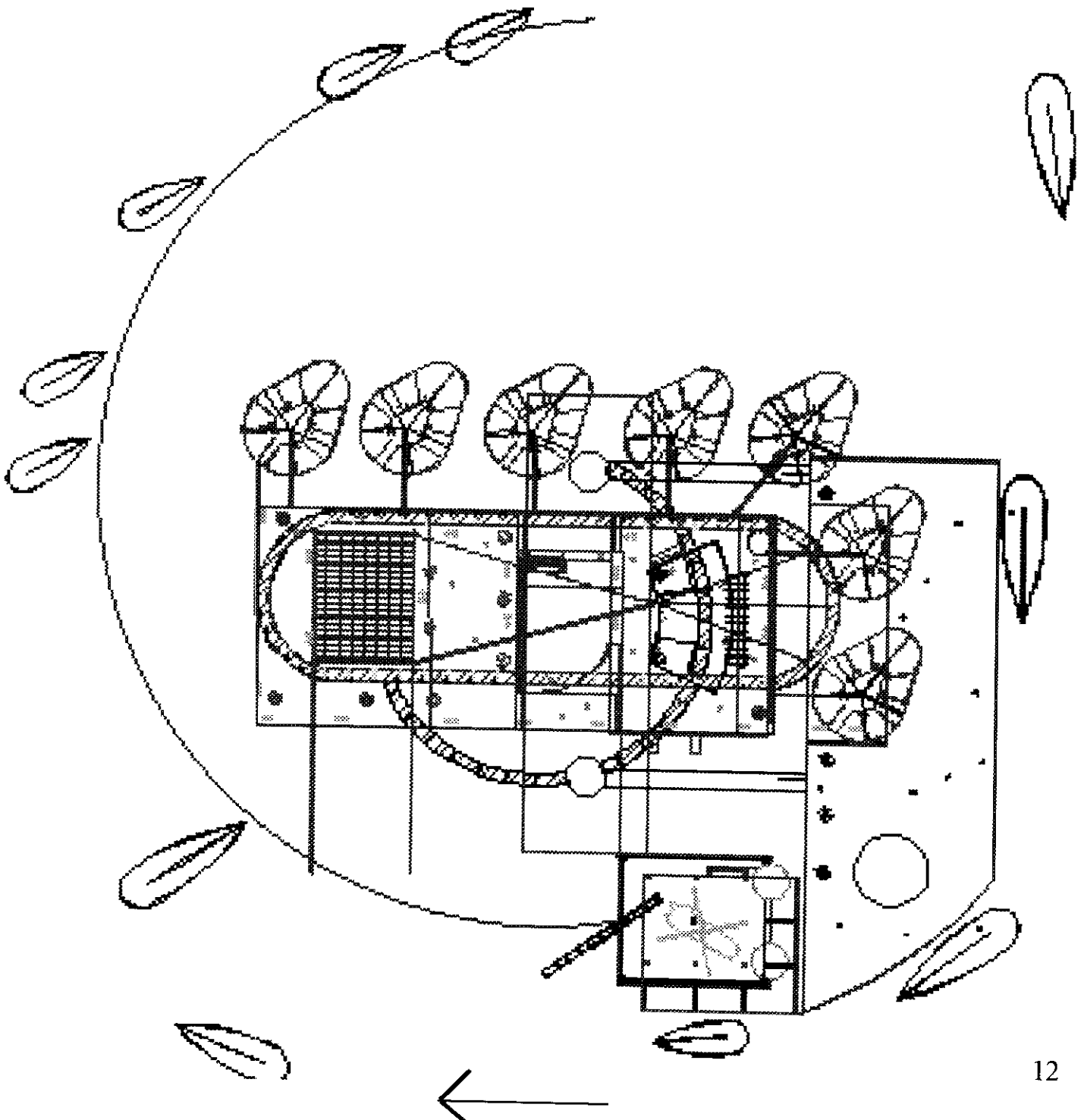


Photos of the prefabricated building units placed on oil drilling rig platforms.

The existing structures located on offshore oil drilling rigs are prefabricated such as those shown in the photos above. These structures are supplied by numerous prefabricating factories. Offices, sleeping areas, dining facilities and indoor recreation areas are all brought to the oil rig platforms in this manner. For my design, I think that prefabricating numerous units would be a very cost effective and high quality way of developing the offshore oil drilling rig platform.

Overall Plan

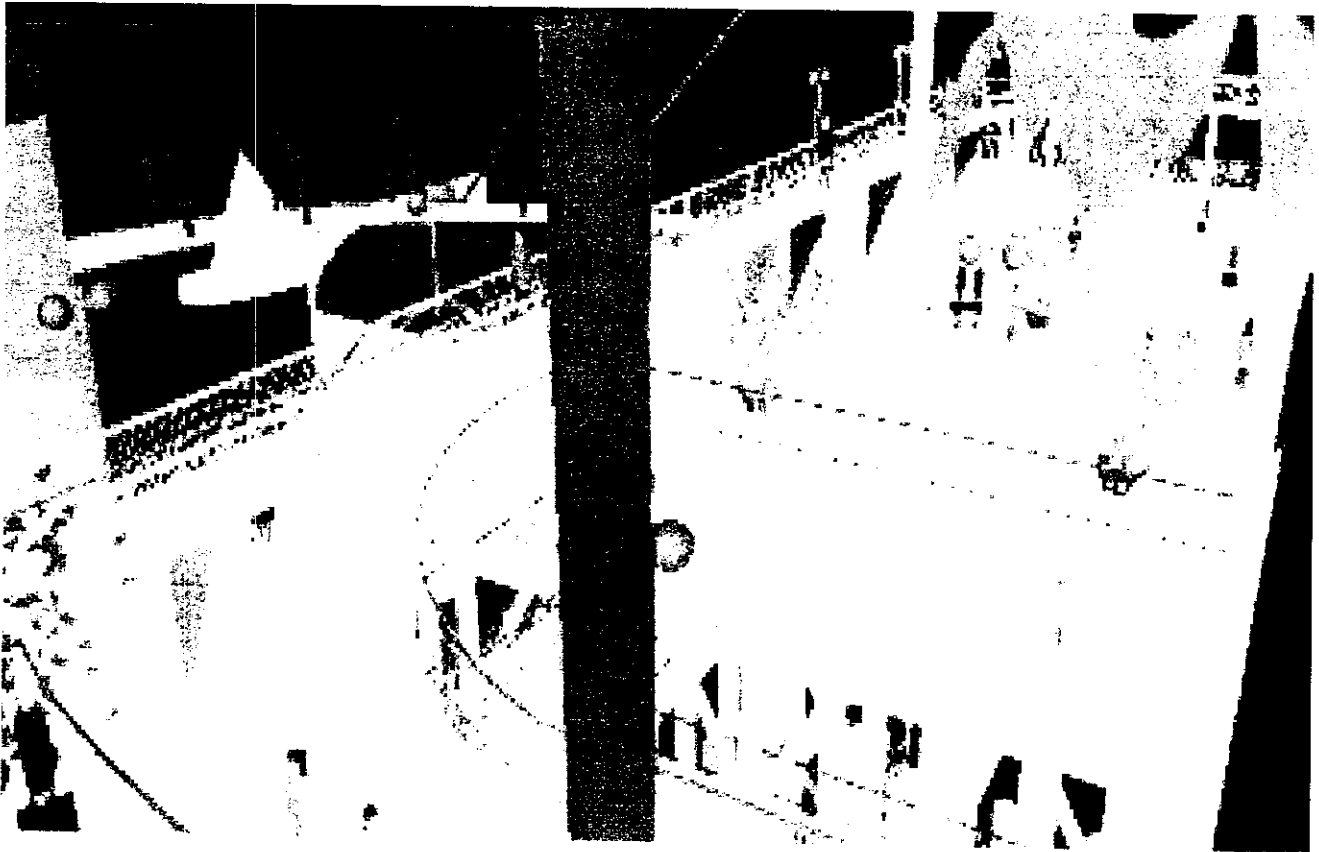
The overall plan for the facility took on a spiral shape which originates at the center of the rig where the swimming pool is located and spirals out into the gulf where baots are parked. Notice the smaller platform area which has been located off of the west side of the platform. This deck area is where services would be delivered via helicopter and boat.



Thesis Arguments, Conclusions, and Recommendations for Future Studies

Offshore oil drilling rigs are extremely expensive structures for oil companies to construct. They can cost over 500 million dollars in initial construction costs alone. Over an offshore oil drilling rig's lifetime, they require several additional millions of dollars in operation and maintenance costs. When offshore oil drilling rigs are retired, they are often abandoned. This occurs when the level of oil they are pumping is no longer profitable to justify their operation. When left abandoned, the majority of these massive structures are still structurally in excellent condition. Offshore oil drilling rigs are structures which few people ever have the opportunity to visit. Most people only see these structures on television or from a great distance away. Converting an abandoned offshore oil rig into a facility which can be visited and enjoyed by all interested people is the principal goal of my thesis project. Turning an abandoned offshore oil drilling rig platform, into a facility which can be viewed for its structural and architectural significance, would be an ultimate expression of how structures can be altered and adaptively reused for a non-original use.

When I originally became interested in this project, I was looking for a waterfront site along the east coast to design a yacht club facility, similar to those we are familiar with today. While researching into my project, I came across information which briefly mentioned an offshore oil drilling rig. I have always been very interested in adaptive reuse architecture and building and exploring structure types which I am unfamiliar with. Throughout my research, I found myself becoming



increasingly interested in the structure and organization of offshore oil drilling rig platforms. The 1995 movie entitled *Waterworld* also made me become more interested in the subject area of designing for an oceanic environment. After much research and seeing where my interests were leading me, I decided to then locate my facility on an actual abandoned offshore oil drilling rig platform rather than designing an entirely new structure.

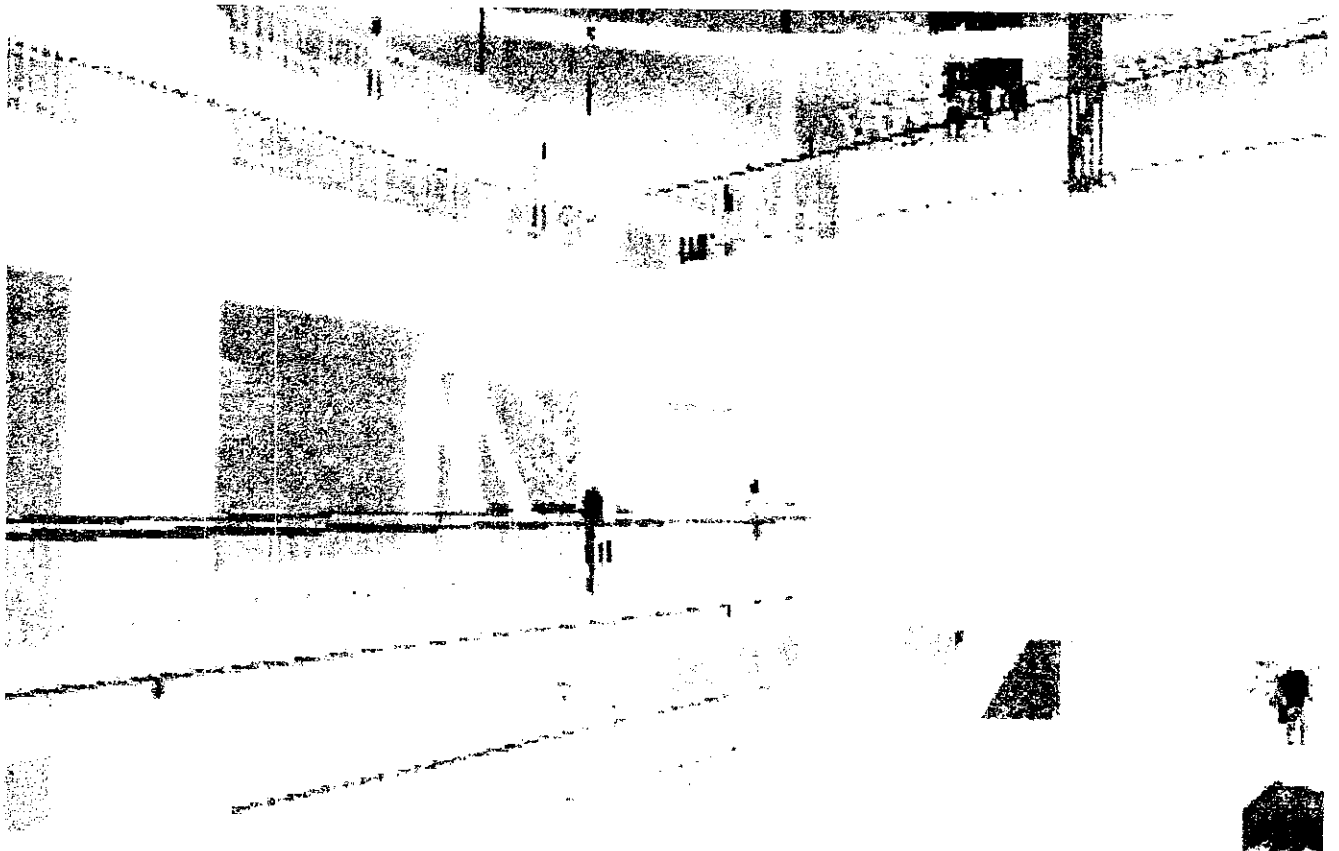
In order to locate an actual platform to redesign, I contacted a construction manager and a project engineer from a major oil company. They sent me several sets of plans of offshore oil rig platforms which are located in close proximity to the shore of Louisiana. The top deck of the platform design I selected to redesign measures approximately 90' X 200'. The top deck is located approximately 70 feet above the water level. Rather than adaptively reusing the actual prefabricated buildings which were originally located on the rig, I chose to remove them and design totally new structures which better accommodate my facility's program. The buildings which are located on offshore oil drilling rig platforms such as sleeping quarters, dining areas, and offices are purchased from suppliers that specifically build these structures for oil companies.

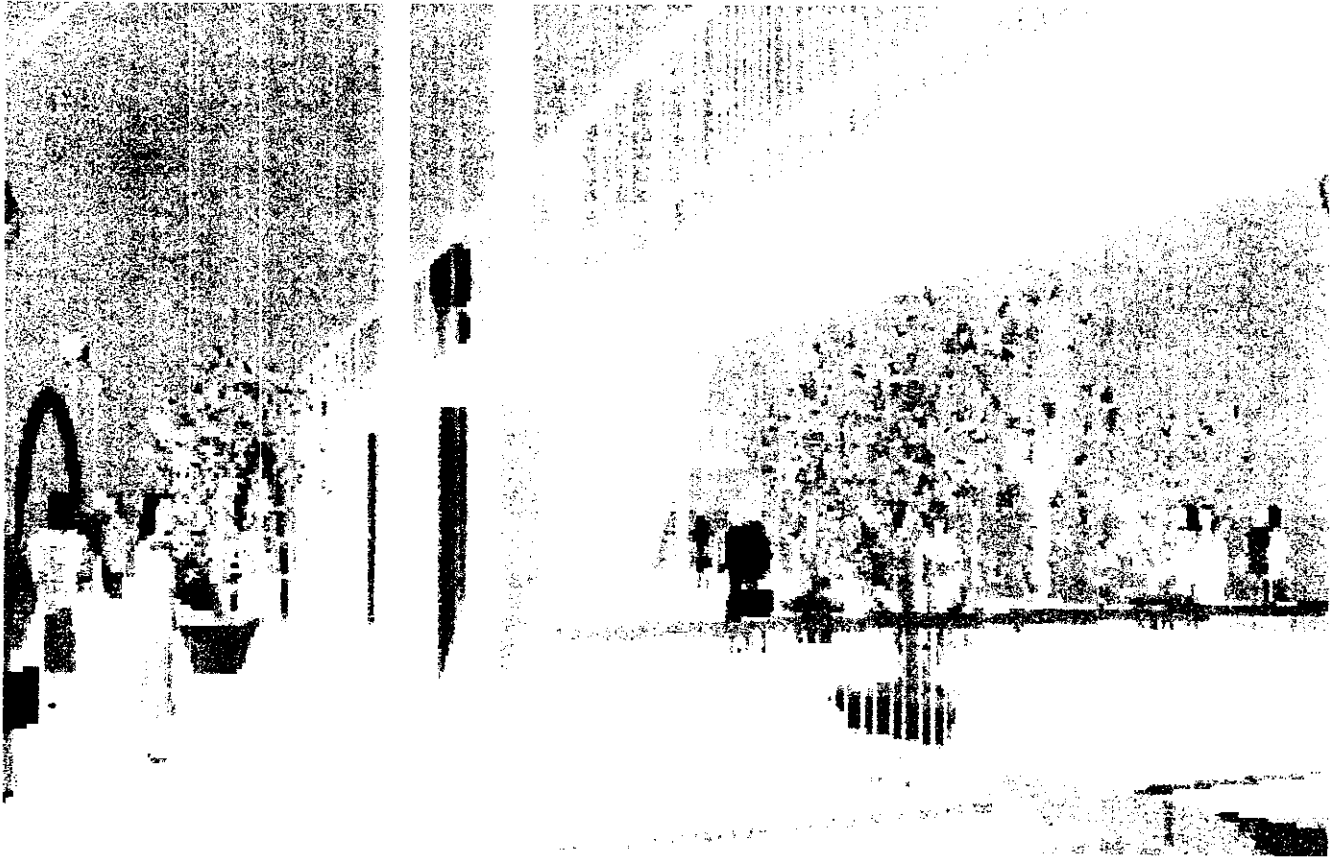
I have chosen to schematically design a facility which is designed around two types of users: people leisurely traveling about the Gulf of Mexico via boats, and conference attendees from across the United States. After studying the designs of various yacht clubs along the Intracoastal Waterway, I decided to add a conference facility to my program. This will allow and encourage numerous visitors from throughout the United States to patronize this facility. Combining a conference facility with my yacht club will greatly increase the amount of revenue generated by the facility and attract people who may not otherwise visit the facility.

be accustomed to the marine environment

Through my thesis project I have concluded that using an offshore oil rig for a yacht club / conference facility would be a great opportunity to explore adaptive reuse architecture in an ocean environment. As stated earlier in this section, I felt that all the major interior volumes for the facility should be moved away from the platform itself, yet attached to it in some way. My final design uses various methods of incorporating spaces off of the main platform in a variety of ways such as the submersed restaurant, suspended hotel rooms, a suspended convention center and a floating fueling and entry deck located on the water so facility guests can easily exit and board their boats.

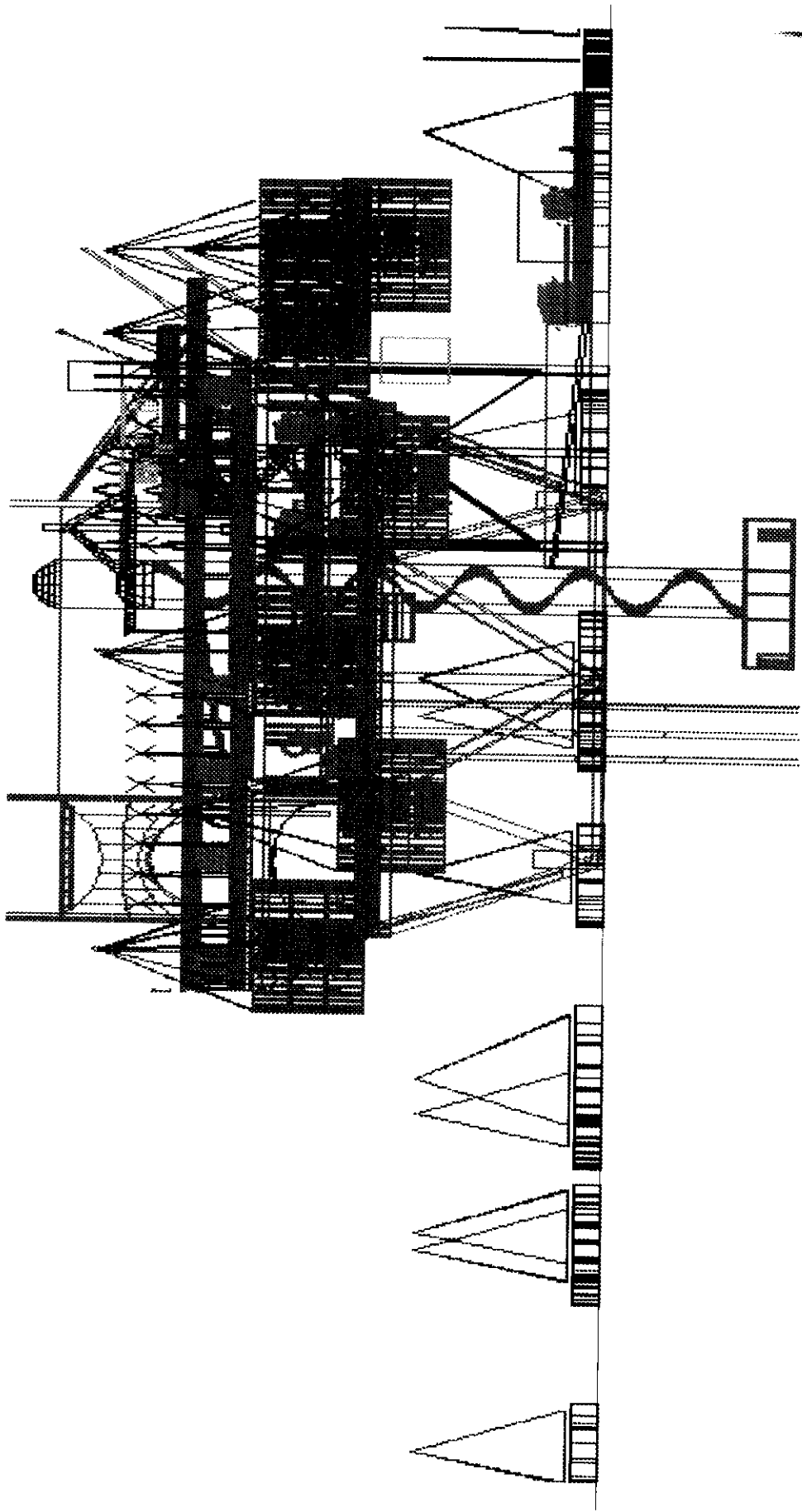
I chose to locate the hotel rooms, which take up the greatest amount of square footage in the facility, in modules suspended off of the east and south sides of the platform's structure. These aerodynamically shaped modules can be moved around and repositioned towards the wind. Each module is three stories tall and is able to accommodate a total of 60 guests. There are a total of 7 of such modules suspended from the platform. Each individual room would have its own bathroom facility. Water intake for these modules would be supplied from the water tower located on the main deck. Sewage would flow from each module to the incinerating system located on the platform's lower deck. Each module can be lowered and raised for ease of servicing. Each of these modules, as most of the structures on the platform would be prefabricated on land and then moved by boat out to the platform.



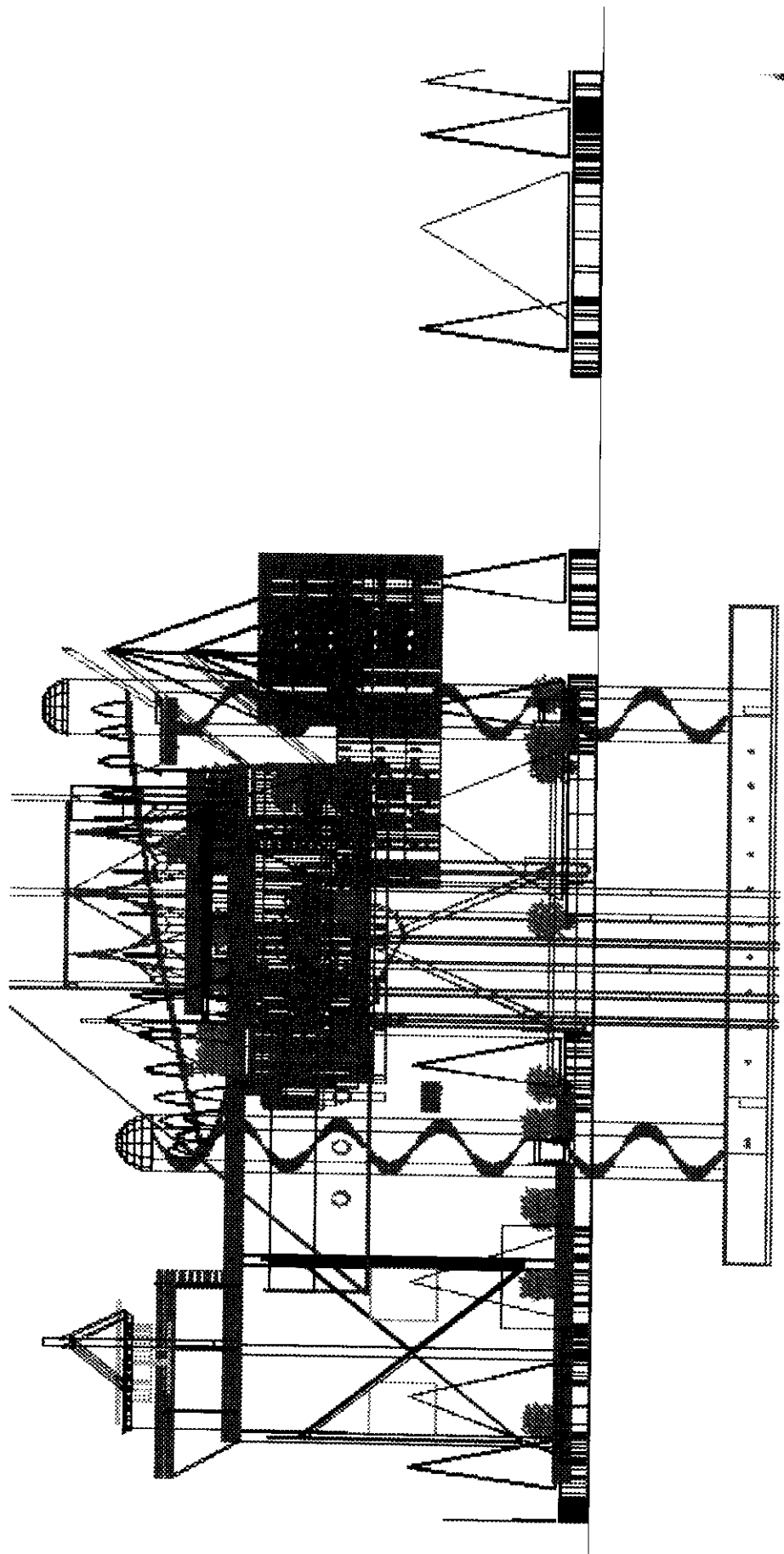


The underwater restaurant facility is also designed so that it can be prefabricated on land before moving it out to sea. This module would be built in much the same manner as submarines are constructed today. Two cylindrical elevator/ stair towers rise out of either end of the submerged restaurant module. These towers will be constructed as sleeves built off of the restaurant module which will contain the elevator workings. The elevators lead up to the top deck of the platform to a curving ramp. This ramp, which encompasses the top deck, will allow the visitors of the facility to have an overall view of the facility from above before they actually set foot on the top deck of the platform. A section of the top deck was cut away so visitors can view down into the internal structure of the rig and catch a glimpse of the original 12 hole drilling pipes which extend far into the ocean floor.

The conference facility on the rig was designed so it can be pulled on or off the lower deck. This allows for a larger part of the lower deck to be used for recreational activities when the weather is good. When the weather is bad, or there is no need for this extra space on the rig, the conference room may be retracted back into the the drilling rig platform.



West Elevation

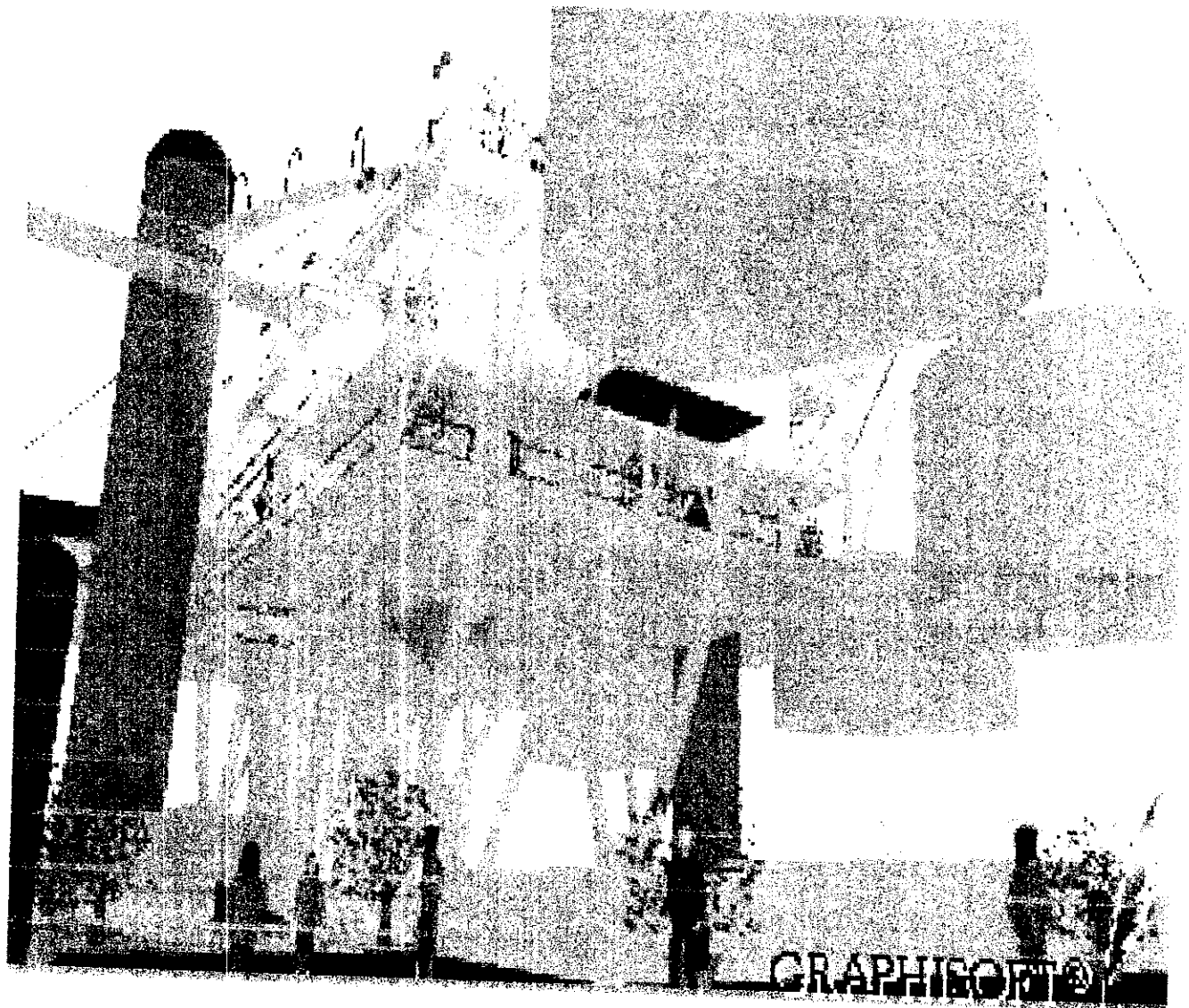


South Elevation

The final design for this project placed emphasis on the existing rig structure itself. At the same time it moved elements from the rig into the surrounding ocean environment. The canvas structure located on the top deck could be retracted if so needed. It provides a sheltered area yet remains open to the surrounding deck.

I feel that the existing structure of the existing platform should be very articulated structurally so that those visiting it will understand how it works. By opening up the top deck and freeing up the lower decks, one can clearly understand how such a structure functions. Large structural elements should be used in keeping with design of the current structure.

Adaptively reusing an abandoned offshore oil rig for a yacht club / conference facility in the manner prescribed through my thesis project would make a potentially burdensome structure into a vibrant, exciting, lively place for people to visit at their leisure.



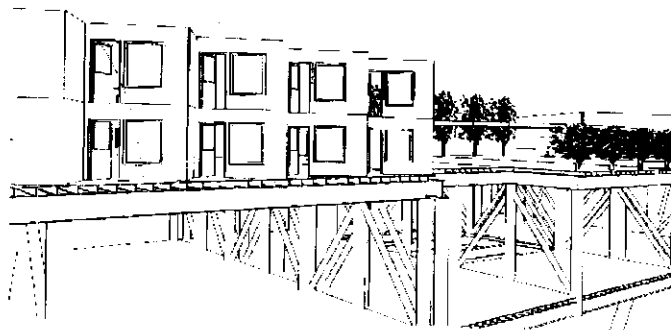
Schematic Design Options and Conclusions

Numerous ways of converting the existing oil drilling rig platform into a Yacht Club / Conference Facility were considered prior to the final design plan. When I began working with the structure of the existing rig, I thought that I should build on top of the platform by allowing the top level of the platform to act as a ground plane. My original design had a hotel and restaurant design built on top of the platform which appeared very much like any conventional hotel and restaurant that one might visit. I found this approach to be very boring when compared with the dynamics of the existing structure.

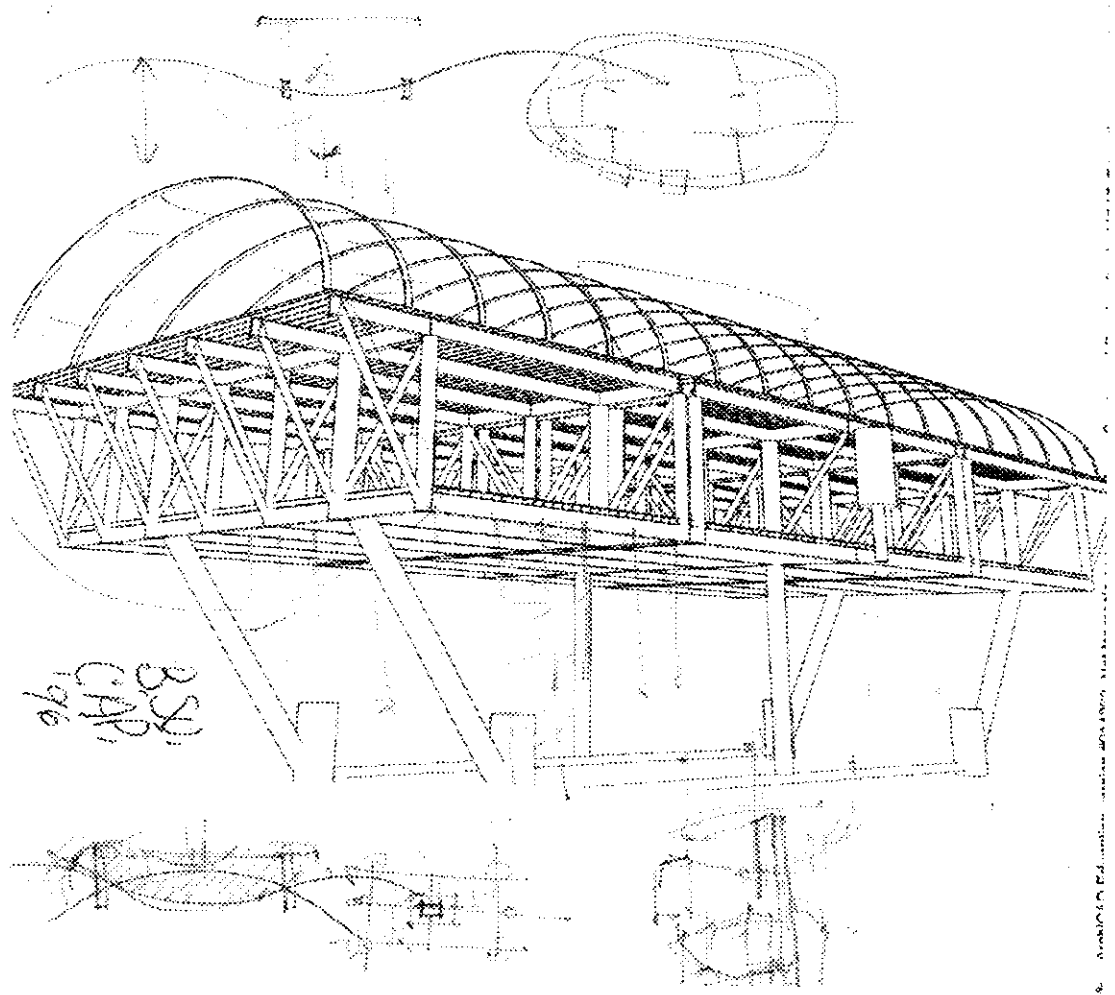
My second schematic design idea was to locate part of the structure off of or away from the existing rig structure - treating the flat area on the rig as a precious object such as a park in the middle of a large city. To experiment with this idea, I located the hotel rooms in three large cylinders floating adjacent to the structure. These cylindrical structures were vertically held up by supports stretching from the platform's structure. This freed up the deck structure for other purposes while creating numerous hotel rooms to house guests. This stage of design marked the beginning of my movement off of the deck.

For my third schematic design idea, I looked at placing the hotel part of my facility in gondola-like modules suspended below the cellar deck of the rig. I found this to be a very interesting study, however, rooms located in this position would not offer the best of views, nor would they be exposed to direct sunlight. This would be a great location for sheltering the rooms. I find this room location to be very feasible and feel that with further study, it could have strong design possibilities.

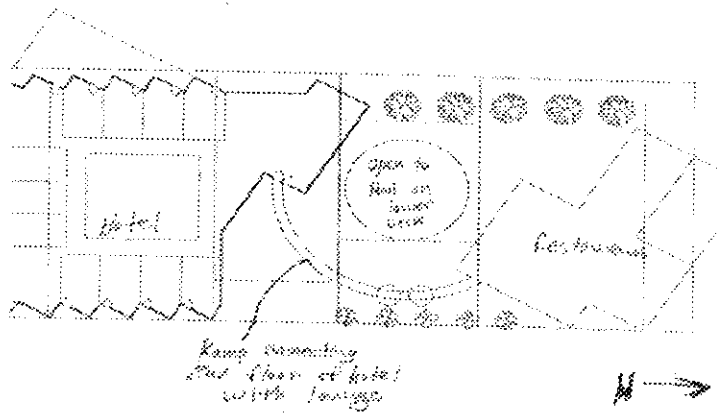
Transporting visitors from the water level up to the dock level was also an important issue to the design of my facility. I had several early schematic ideas such as creating a telescoping elevator which would protrude down from the main deck to a floating deck on the water level below. Another design idea was to create a circular tram which would vertically "orbit" about the entire rig passing underwater at places and leading up to the top deck. I feel that this too is a creative solution to the



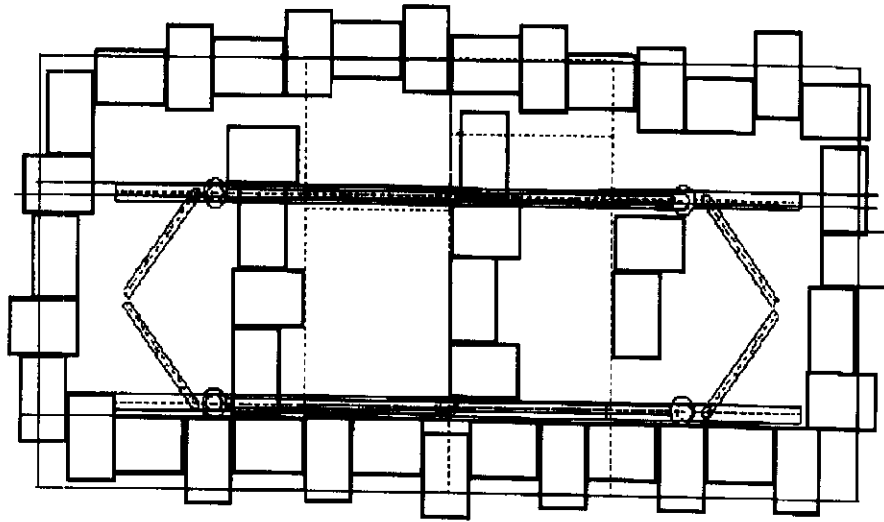
My first design idea involved building on top of the deck in the manner shown.



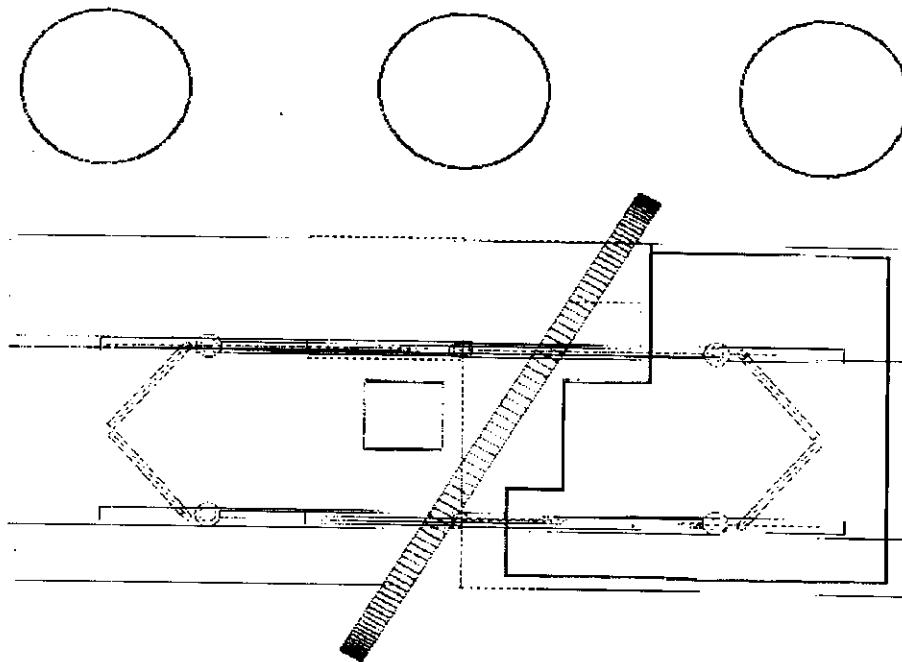
Sketchings of preliminary design ideas.



Plan view of top deck in preliminary design.



Preliminary design idea which involved locating rooms and employee housing in modules suspended from the deck.



Design idea in which hotel rooms were located in large floating cylinders suspended from main deck. In this design, a tram "orbits" the entire platform.

Design Development Conclusions

As stated earlier, this is a very new design idea as far as I could tell from my research of adaptively reusing platforms. I was not able to find much information which directly dealt with reusing such facilities. Each of the options I considered would be viable means of designing such a project, however I feel that my final design was most interesting of the ones I studied through this project.

Through my study of adaptively using an offshore oil drilling rig platform for a Yacht Club / Conference Facility, I came to many design development conclusions. Redesigning an abandoned offshore oil rig facility would be a great challenge to any architect, but it would be possible. Unlike a cruise ship which goes in and out of a port, the rig would be stationary -- located in the same position for its lifetime. Therefore, the offshore oil drilling rig structure would have to be able to stand up to the various weather conditions found in the Gulf of Mexico. Users of this facility would have to boat out to it rather than board it like a cruise ship. This type of experience would be much more adventuresome than taking a cruise.

An important conclusion that I arrived at was that the rig must be softened or made more welcoming in appearance. This could be done through the usage of plants, numerous construction materials and various spatial elements. As stated earlier in this book, the main focus of such a project would have to be the major issues such as delivering services to the remote site.

Another issue which would have to be closely examined would be the psychological effects of a person visiting or working out on a platform away from land in the middle of the water. In my design, I placed a running track about the top deck and made provisions to create numerous smaller, intimate spaces around my deck. I feel that this would make the platform a much more desirable place to visit.

Through this study, I have concluded that designing against hurricanes would not be very possible for this type of environment any more than has already been done through the structure of the platform itself. Evacuation methods would have to be clearly defined and designed into the overall plan of the facility.

SUMMARY OF SPACES

75 ROOM HOTEL:

50 2 DOUBLE BEDS @ 300 S.F. EA =	15,000 S.F.
25 1 DOUBLE BED @ 250 S.F. EA. =	6250 S.F.
MAID/ LAUNDRY SERVICE ROOM	500 S.F.
ADMINISTRATION	<u>500 S.F.</u>
	22,250 S.F.

<u>CIRCULATION</u>	ABOVE X 15% =	<u>3338 S.F.</u>
	TOTAL	25,588 S.F.

200 SEAT RESTAURANT:

DINING ROOM (200 X 22 S.F. PER PERSON)	4400 S.F.
KITCHEN (200 X 6 S.F. PER PERSON)	1200 S.F.
<u>RESTROOMS</u>	<u>500 S.F.</u>
	TOTAL
	6100 S.F.

80 PERSON LOUNGE:

SEATING AREAS (100 X 18 S.F. PER PERSON)	1800 S.F.
PREPARATION AREA (100 X 3 S.F. PER PERON)	300 S.F.
<u>RESTROOMS</u>	<u>300 S.F.</u>
	TOTAL
	2400 S.F.

INDOOR EXERCISE / RECREATION FACILITY:

EXERCISE ROOM	500 S.F.
RECREATION ROOM	1000 S.F.
<u>RESTROOMS / SHOWERS</u>	<u>500 S.F.</u>
	TOTAL
	2000 S.F.

CONFERENCE CENTER / THEATER / DISPLAY AREA:

200 SEAT AUDITORIUM (200 X 22 S.F. PER PERS.)	4400 S.F.
RESTROOMS	500 S.F.
LOBBY / GALLERY	1000 S.F.
<u>SUPPORT SPACE</u>	<u>500 S.F.</u>
TOTAL	6400 S.F.

CONVENIENCE STORE:

DISPLAY	1000 S.F.
STORAGE	200 S.F.
<u>RESTROOM</u>	<u>50 SF.</u>
TOTAL	1250 S.F.

FUELING STATION:

OFFICE / SUPPLY STORAGE BUILDING (OUTDOOR DOCKING NEEDED 200 LINEAR FEET)	300 S.F.
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SLIP RENTAL / DOCKING:

OFFICE (50 BOAT SLIPS @ 15' WIDE EACH = 750 LINEAR FEET OF FLOATING BOAT DOCKS)	200 S.F.
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SHOWER / LAUNDRY FACILITY FOR DOCKED VISITORS:

SHOWER ROOMS	1000 S.F.
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MANAGER'S APARTMENTS:

20 @ 250 S.F. EACH	5000 S.F.
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TOTAL OF ABOVE SQUARE FOOTAGES	51638 S.F.
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<u>SUPPORT / MECHANICAL 46638 X 5%</u>	<u>= 2582 S.F.</u>
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GRAND SQUARE FOOTAGE TOTAL OF INTERIOR SPACES

54,220 S.F.

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