

TRAINING AND DEVELOPMENT OF DIVING TOURISM CENTER

AMORN WORNGWONGSRI

A THESIS SUBMITTED IN PARTIAL
FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF


BACHELOR OF ARCHITECTURE

DEPARTMENT OF INTERIOR ARCHITECTURE, SCHOOL OF ARCHITECTURE
ASSUMPTION UNIVERSITY

2004

Training and Development of Diving tourism center

Amorn Worngwongsri

A large, faint watermark seal of Assumption University of Thailand is centered in the background. It features a circular border with the text 'ASSUMPTION UNIVERSITY OF THAILAND' at the top and 'มหาวิทยาลัยอัสสัมชัญ' at the bottom. Inside the circle is a shield with a cross, flanked by two figures, and a banner below it with the text 'BROTHERS OF LABOUR' and 'S1 GABRIEL'. The shield is surrounded by a wreath of leaves. Below the shield is a banner with the text 'OMNIA' and 'SINCE 1969'.

**A Thesis Submitted impartial
Fulfillment of the Requirements
For the degree of
Bachelor of Architecture**

Department of Interior Architecture, School of Architecture

ASSUMPTION UNIVERSITY

2004



Thesis Approved:

Date

Pisit Viriyavadhana , DEAN

Date

Vatcharat Samakkamai, Chairperson

Date

Porawan Kokiatsanit, Thesis Supervisor

Training and Development of Diving Tourism Center

Amorn Worngwongsri

65 pages

2004

March, 2005

Nowadays, Thailand becomes a favorite country for Thais and foreign whoever comes to study and travel scuba diving. This business is growing up every year and this business can bring a high value income. Thailand has a wonderful place for travel but it still lacking some thing that can make it better and equal with other country.

Thailand is the interesting place for the foreigner to study and travel in scuba diving but it is lacking of the development that become a problem for the growing up of this business in this country. However these lacking problem can solve and develop to highest level.

This project is created to solve the lacking problems in this business and develop the standard of Thailand to equal with other country in part of study and part of travel and promote Thailand to recognize country to bring the tourist come back again and again.

Thesis Approved:

Date

Pisit Viriyavadhana, DEAN

Date

Vatcharat Samakkamai, Chairperson

Date

Porawan Kokiatsanit, Thesis Supervisor

Acknowledgements

The author wished to thanks:

- Phuket Aquarium & Marine science.
- Sporttime Diving Center.
- Safety Stop
- Dive Master
- Mr. Palung
- Mrs. Radjada
- Mr. Piyapong
- Mr. Threerayu
- Mr. Sujaras



Table of Contents

Page

Acknowledgement

List of Figure

List of Table

Chapter One: Introduction

Project proposal	1
Scope of research	6
Scope of project	7

Chapter Two: Research

2.1 Literature Review

- Scuba diving in Thailand	10
- Curriculum of diving institute	11
- Physical of diving	11

2.2 Case study

- Hall diving institute	13
- Minnesota School of diving	18
- Ok marine pro	22
- Safety stop	24
- Dive master	26
- Aqua gallery	27

Chapter 3 Project Facts

3.1 Site analysis

- Back ground	28
- Site plan & Surrounding	29
- Building analysis	30

Chapter 4 Data Synthesis and Programming

4.1 Area requirement

- Organization chart	33
-----------------------------	-----------

- Human resource	34
- User behavior	35
- Area requirement	37
4.2 Bubble diagram	40
4.3 Functional diagram	
- Function of Visitor, Student and Staff	41
4.4 Zoning diagram	
- Zoning Diagram of first floor plan	42
- Zoning Diagram of second floor plan	42
- Zoning Diagram of third floor plan	43
Chapter 5 Design portion	
5.1 Process of conceptual development	44
5.2 Lay-out plan	
- First floor plan	45
- Second floor	46
- Third floor	47
5.3 Ceiling plan	
- First floor	48
- Second floor	49
- Third floor	50
5.4 Design Development	51
5.5 Color perspective	
- Counter Reception	53
- Registration area	54
- Meeting area	55
- Circulation	56
- Counter TAT 1	57
- Counter TAT 2	58
- Accommodation waiting area	59
- Restaurant	60
- Library	61
5.7 Elevation & Section	62

5.8 Space Model

63

Bibliography

65



List of Figures

Number	Page
<u>Figure 2.1</u> The picture of Halls Institute from air	13
<u>Figure 2.2</u> This picture of map location	13
<u>Figure 2.3</u> Picture of instructor training	13
<u>Figure 2.4</u> Picture of dive goes down	14
<u>Figure 2.5</u> picture of diver Rebreather training	14
<u>Figure 2.6</u> nitrox fill-up	14
<u>Figure 2.7</u> Dive master And boat master Training	15
<u>Figure 2.8</u> Diver rescue Training	15
<u>Figure 2.9</u> Photography Diver	15
<u>Figure 2.10</u> Digital photo Training	15
<u>Figure 2.11</u> Digital videography Diver	16
<u>Figure 2.12</u> Scuba maintenance Training	16
<u>Figure 2.13</u> machine maintenance Training	16
<u>Figure 2.14</u> sale service Training	16
<u>Figure 2.15</u> Dive business Training	17
<u>Figure 2.16</u> sale manager training	17
<u>Figure 2.17</u> Picture of Minnesota school of diving	18
<u>Figure 2.18</u> Zoning of Minnesota school	18
<u>Figure 2.19</u> picture of show room	19
<u>Figure 2.20</u> picture of show room	19
<u>Figure 2.21</u> picture of fill station	19
<u>Figure 2.22</u> Repair & Hydrostatic area	20
<u>Figure 2.23</u> another side for show the hydro static area	20
<u>Figure 2.24</u> Class room	20
<u>Figure 2.25</u> class room from front side	20
<u>Figure 2.26</u> Training tank	21
<u>Figure 2.27</u> Rental room	21
<u>Figure 2.28</u> Ok marine pro building	22
<u>Figure 2.29</u> Training pool in side building	22
<u>Figure 2.30</u> Picture of shallow level in training pool	22
<u>Figure 2.31</u> Picture of deep level in training pool	23
<u>Figure 2.32</u> Picture of training area at deep water	23
<u>Figure 2.33</u> Class room	23
<u>Figure 2.34</u> Class room	23
<u>Figure 2.35</u> Retail shop	23
<u>Figure 2.36</u> Front of safety stop diving center	24
<u>Figure 2.37</u> Counter in retail shop	24
<u>Figure 2.38</u> other side in retail shop	24
<u>Figure 2.39</u> front of class	25
<u>Figure 2.40</u> Class room	25
<u>Figure 2.41</u> The circulation between the shop and pool	25
<u>Figure 2.42</u> The rest area	25
<u>Figure 2.43</u> pool	25
<u>Figure 2.44</u> Front of Dive master shop	26
<u>Figure 2.45</u> Reception Counter	26

<u>Figure2.46</u> display	26
<u>Figure2.47</u> Counter service	26
<u>Figure2.48</u> Class room	26
<u>Figure2.49</u> Aqua gallery lamp design	27
<u>Figure2.50</u> Lamp in the hall	27
<u>Figure 2.51</u> hall restaurant	27
<u>Figure 2.52</u> Hall restaurant	27
<u>Figure2.53</u> Circulation	27
<u>Figure3.1</u> Site plan and surrounding	29
<u>Figure3.2</u> First floor plan	30
<u>Figure3.3</u> Second floor plan	30
<u>Figure 3.4</u> Third floor plan	31
<u>Figure 3.5</u> Organization chart	33
<u>Figure3.6</u> User behavior beginner study	35
<u>Figure3.7</u> user behavior advance student	35
<u>Figure3.8</u> user behavior group student	36
<u>Figure3.9</u> user behavior group tourist	36
<u>Figure 4.0</u> user behavior group staff	36
<u>figure 4.1</u> Bubble diagram	40
<u>Figure 4.2</u> Functional diagram	41
<u>Figure 4.3</u> Zoning First floor plan	42
<u>Figure 4.4</u> Zoning Second floor plan	42
<u>Figure 4.5</u> Zoning Third floor plan	43
<u>Figure 5.1 (left)</u> Water surface effects	44
<u>Figure 5.2 (below)</u> Light absorption	44
<u>Figure 5.4</u> First floor plan	45
<u>Figure 5.5</u> Second floor plan	46
<u>Figure 5.6</u> Third floor plan	47
<u>Figure 5.7</u> Ceiling First floor plan	48
<u>Figure 5.8</u> Ceiling second floor plan	49
<u>Figure 5.9</u> Ceiling third floor plan	50
<u>Figure 5.10</u> Counter Reception	53
<u>Figure 5.11</u> Registration area	54
<u>Figure 5.12</u> Meeting area	55
<u>Figure 5.13</u> Circulation	56
<u>Figure 5.14</u> Counter TAT	57
<u>Figure 5.15</u> Counter TAT	58
<u>Figure 5.16</u> Accommodation waiting area	59
<u>Figure 5.17</u> Restaurant	60
<u>Figure 5.18</u> Library	61
<u>Figure 5.19</u> Elevation A	62
<u>Figure 5.20</u> Elevation B	62
<u>Figure 5.21</u> Elevation C	62
<u>Figure 5.22</u> Section	62

Chapter 1 : Introduction

History and Background

The beginning of DIVING is in the ancient period when the human start to find the food in the sea. It is mainly used for finding food or military service. Since King Alexander period, The DIVING has been used in the war. However, Diving is not widely used at that time.

After World War 2, The Diving is become a "Sport" when two French inventor (Jacques Cousteau and Gannan) has invent the "regulator" which is used for diving. It is very comfortable for the diver. It's make the diver feel free to move in the water because it has a few line over the diver's body. Diving start to popular in many groups of people. A number of diving association are established especially in the state (United state of America), which make the diving sport widely spread out very fast. Because of these situations, the conference is made for sharing the idea to set up the regulation and performance about savable diving at Yale University. This conference is under the execution of the council of national Co-operation in aquatic (CNCA). YMCA by YMCA Chicago branch is the first associations that formally open the diving course. YMCA has declared that diving activity is one of the association activity and it is the first time that they issue the certification in "skin and scuba diving instructor" . In 1959, The National Association of Underwater Instructor (NAUI) has opened the instructor course in the first time. That's why; the diving sport is widely spread very fast and very popular in almost around the world. The diving in Thailand started since 1953.(2496 B.C.)When the Thai Royal Navy has sent seven officers to Zalpan Micronia Island for diving training. When those officer came back, They gave the diving knowledge to the military student for fourteen person until finished the Underwater Attack course in October 26, 1954 (2497 B.C.) and a year later, Underwater Attack Platoon is established which is continuous develop at all time. Recently, Thai Royal Navy has setup RECON unit and SEAL unit for the task forces.

The scuba diving sport in Thailand begin in almost the same time of the growth of Pattaya , Chonburi by American Soldier who settle at "U-tapal" base. Some of the American soldier usually come to Pattaya beach to take a rest and spend their time by diving to see the wonderful underwater world in some island around Pattaya area which is very comfortable because they can go diving 2-3 dive in just one day such Koh Sark, Koh Klok, Koh Larn and also the area that has a lot of old ship under the sea. For example, Petchbure Braman and Har deep at Rong Klarm. Mr. Dusty Rhode is the trainer of American soldier who is one of the supreme divers in Thailand.

In 1974, Mr. Damrong Satukarn is the first Thai diving instructor who just came back from the State (USA). He invited and motivated his Thai friend, who interest in diving, to study diving Mr. Dorn Rattanatusanee and Mr. Sompong Budsarakomvisit are the first group of student who study diving until they can be the instructor. After that, both instructor has instruct their student by themselves which is the small group because one diving trip is very expensive. There are a lot of expenditure when compared with other sport. Further more, The one who interested in this sport still fear about the dangerous of diving sport and the boat which is suit for the diving trip, safety boat, air tank, communication device and navigation device are restricted

In 1983 “Thailand” become one of the world best diving spot when Mr. Jacques Cousteau, the world supreme diver come to Thailand by their boat which is called “Calypso” In order to search for the world wonderful underwater world around the “Similan island” and he certified that is the one of the top-ten world diving spot. After that, “Similan” and other area around are the destination of the diver from all around the world. In 2000, The Tourism Authority of Thailand (TAT) can see that the diving tourism will make a very huge income for Thailand. That why, The Tourism Authority of Thailand beside to make a big diving exhibition that call “ADEX” (Asia Diving Expo) and a lot of project are launched that out such as Underwater Wedding, Underwater environment conservative project. The tourist will more interested in diving and come to travel in Thailand. Thus, The Diving business is very important that can make a very huge income for Thailand.



Reason for study topic

Nowadays, Thailand becomes a popular destination for both Thai and foreigner who interested in travel and study in scuba diving. This business can bring in a high value income and it's still growing every year. The author would like to offer the suggestion in order to develop this business to be equal to international standard.

The author suggestions for develop this business are as following:

-To promote scuba diving in Thailand and dive site in Thailand to Thais and foreigner who are an amateur diver or advance diver to know information about diving in Thailand.

-To develop the site and area around panwa to be a departing pier for the diving trips because the location of panwa cape is very convenient to go to popular dive site such as phee phee Island. Similan Island and other

-To upgrade the standard of scuba diving in Thailand to be equal to the international level.

-To train the professional diving and diver with high standard skill.

-To offer the up to date information as well as useful knowledge of diving to diver and general interested people.

-There are many tourist both Thais and foreigner come to Phuket and Phuket is a center of diving in the south of Thailand. Pan wa cape has a good location for build the diving information center which providing full services diving facilities to support the tourists.

The Objective of study

The objective that the author presents is responding to following the reasons of study this topic and problem about training and tourism. The objective of this program will make the diving business more efficiency and advantage for training and tourism of diving.

The objective that will be an advantage and development of diving business by appear by this following

- Providing all scuba diving training facility in order to produce the efficient instructor and student.
- To build the first full services diving center in Thailand has the readiness to support the diving tourist activities and events.
- To provide a business development center for all related diving business entrepreneurs in Thailand in order to raised the potential business opportunists and incomes.
- To become a model place for future development in the diving field.
- To attract and motivate the local and foreign tourist to participated in diving sport.

Thesis statement

The purpose and source of this thesis statement come from the objective that would like to create an innovative and development for diving business in Thailand. There are two parts that the author concerns about this project. There are the problems of “Scuba diving training” and the problems of “Development of diving tourism”

1. Scuba diving training

The problem about scuba diving is the lacking of efficiency instructor such as the technical diving and the part that never have in diving shop in Thailand like training about managing of diving business or live aboard. Lacking of the place for teach and collect the information or exhibition for scuba diving.

2. Development of diving tourism

There are many diving tourist come to Thailand every year, including Thais tourist but it's lacking the center that can connect and advise the information to tourist for dive in Thailand. Lacking of some service that should have for support the tourist such as diving equipment maintenance service.

From these problems, the result that can solve this problem following this thesis statement:

Design the *Training and Development of Diving Tourism Center* that attract the tourist interesting about diving and give the knowledge that covers everything about Diving. Support the information and service for tourist who would like to Dive in Thailand and promote the Dive Site in Thailand to foreigners .

Scope of research

The research of this project comes from the combine of objective and thesis statement. Research will include many things about scuba diving in Thailand and functions that are important factor to support and analyze the development of this project

-The organization of Tourism Authority of Thailand and organization of the system of diving business.

-Type of tourist and number of the diver in Thailand.

-Policy of Tourism Authority of Thailand that concern the diving information about tourism in Phuket.

-The curriculum of diving institute both local and international.

-Function and facilities every thing that relate to education and tourist diving such as Class room, Laboratory, Rest room, Office, Accessories shop and etc.

-Creative conceptual design and space planning.

Scope of project

Follow the topic, this project is combining between the part of training and study and the part of tourism. In each part will require the different function for support the user's activity. Some function is adding for some specific activity and it include the public space also. This isn't a renovate project but it is a project about the new function. Hence, the function in the original building has to change and divide it to be three parts.

1. Training and study area is including

Training area

- Class room
 - Basic and theory class room
 - Technical class room
 - Photography class room
 - Work shop
- Training tank
 - Wash room
 - Locker room
 - Toilet

Study area

- Museum
- Library
- Lecture room

2. Tourism and public area

- Reception
 - Information for tourist
 - Information for training area
- Lobby area
- Retail shop
 - Maintenance service
 - Tank fill-up service
 - Storage
- Accommodation area

- Restaurant
 - Kitchen
 - Storage
- Toilet

3. Specific area and Staff area

Specific area

- Medical and Chamber room
 - First aid area
 - Chamber room
- Exhibition area
- Seminar room

Staff area

- Office
 - Working area
 - Conference area
 - Research and academic
- Pool maintenance
- Scuba equipment store and compressor room *
- Locker room
- Storage

Definition of Terms

Scuba diving – Underwater breathing apparatus consisting of a compressed air, attached by a hose to a mouthpiece.

Regulator - The apparatus that the diver uses for breath

Chamber room – the room for adjust pressure when a diver has an accident while they dive.

Dive site - The place that suitable and beautiful for scuba diving.



Chapter 2 : Research Literature Review

Thesis statement

Design the *Training and Development of Dining Tourism Center* that attract the tourist interesting about diving and give the knowledge that covers everything about Diving. Support the information and service for tourist who would like to Dive in Thailand and promote the Dive Site in Thailand to foreigners .

The state of research

[A] Scuba diving in Thailand

< Faculty of Humanism of Mahidol university, The way of oceanographic resource's development for tourism, case study of Phuket province.

<Scubaglobe Asia pacific, page 50-51(choosing Thailand)>

<Dive & Travel, page 29-33 (Diving in Thailand)>

<http://www.gotomanager.com>

<http://www.businesssthai.com>

Thailand is the one of famous country in Asia for diving. There are many dive sites that can attract the tourist and make a very huge income for country. Every year, Thailand can produce diver more than other country in South East Asia and in 2003, Thailand can produce diver over 70,000. Diving business in Thailand is growing up every year. Majority of diving shop is located at east and south of Thailand but 80% of owner of diving shop is foreigner and majority of the diving shop that manage by Thais is located at Bangkok. Phuket is the famous province in Thailand that has many tourists go to travel. Every year, Phuket has to receive the tourist both Thais and foreigner about 8 million and about 15.7% come for scuba diving in Thailand and increase every year. Although, The government try to support and promote scuba diving in Thailand (Asia diving expo) but most diving shop in Thailand is individual and they lack of money to invest their business because there are many diving shop in Thailand and income is spread to every shop and most diving shop has no own area they have to pay for rent the shop. The big problem of diving business is the number of foreigner diving shop.

[B] Curriculum of diving institute

<http://www.nauai.com>

<http://www.padi.com>

<http://www.ssiusa.com>

There are many institute that approve the curriculum of diving such as nauai, padi and ssi. The curriculum is divided for support the purpose of learning. Every course will be a different curriculum. The general curriculum will divide to be 6 levels including open water scuba course, advance scuba course, master scuba course, rescue scuba course, dive master and instructor. The another course will teach about technical diving in this course, people can select whatever you want to study such as photography, nitrox diving and other but in specific course, the diver should study master scuba first because the diver will have more experience and knowledge enough for technical diving. Another course is scuba equipment maintenance, this course will teach about the equipment and how to maintenance. Every course will require different area for teach and study because some course will emphasize more theory, some course will emphasize about practice or both. So, space in each class will be according to curriculum

[C] Physic of diving (light, sound, buoyancy and pressure)

<The Encyclopedia of Recreational Diving, page 1_13-1_24>

Light, sound, buoyancy and pressure are the principle effect that human can feel when they go to underwater. These effects will make every one feel different with the feeling at the surface. When human go to under water the physical will change and it can make diver confuse. Divers have to adjust themselves when they go to dive and study about it before.

Light

The human eye sees by collecting light reflected from an object, converting this energy into electrical impulses and transmitting them to the brain via the optic nerve and when the light pass through water, water will affect light through turbidity, diffusion, absorption and reflection, each of which affect visibility differently. The light will move in different distance such as the colors in the water, every wavelength will control the visible light and the color through the eyes. The colors has different wavelength and it can divide to be 6 step(red, orange, violet, yellow, green, blue) and the blue color will move in long wavelength so, in deep water every thing will be blue. Speed is the one of element that can refract the light. Example, the pencil in glass water, the eye will see the pencil is broke but actually the light travel at different in different substances, its angle shift as it pass from one medium to another. In the sea, wave is the one of element that can refract the light. When wave move up, it will focus the light to one spot like convex lens and when the wave move down, it will disperse the light like concave lens

[B] Curriculum of diving institute

<http://www.naui.com>

<http://www.padi.com>

<http://www.ssiusa.com>

There are many institute that approve the curriculum of diving such as naui, padi and ssi. The curriculum is divided for support the purpose of learning. Every course will be a different curriculum. The general curriculum will divide to be 6 levels including open water scuba course, advance scuba course, master scuba course, rescue scuba course, dive master and instructor. The another course will teach about technical diving in this course, people can select whatever you want to study such as photography, nitrox diving and other but in specific course, the diver should study master scuba first because the diver will have more experience and knowledge enough for technical diving. Another course is scuba equipment maintenance, this course will teach about the equipment and how to maintenance. Every course will require different area for teach and study because some course will emphasize more theory, some course will emphasize about practice or both. So, space in each class will be according to curriculum

[C] Physic of diving (light, sound, buoyancy and pressure)

<The Encyclopedia of Recreational Diving, page 1_13-1_24>

Light, sound, buoyancy and pressure are the principle effect that human can feel when they go to underwater. These effects will make every one feel different with the feeling at the surface. When human go to under water the physical will change and it can make diver confuse. Divers have to adjust themselves when they go to dive and study about it before.

Light

The human eye sees by collecting light reflected from an object, converting this energy into electrical impulses and transmitting them to the brain via the optic nerve and when the light pass through water, water will affect light through turbidity, diffusion, absorption and reflection, each of which affect visibility differently. The light will move in different distance such as the colors in the water, every wavelength will control the visible light and the color through the eyes. The colors has different wavelength and it can divide to be 6 step(red, orange, violet, yellow, green, blue) and the blue color will move in long wavelength so, in deep water every thing will be blue. Speed is the one of element that can refract the light. Example, the pencil in glass water, the eye will see the pencil is broke but actually the light travel at different in different substances, its angle shift as it pass from one medium to another. In the sea, wave is the one of element that can refract the light. When wave move up, it will focus the light to one spot like convex lens and when the wave move down, it will disperse the light like concave lens

Sound

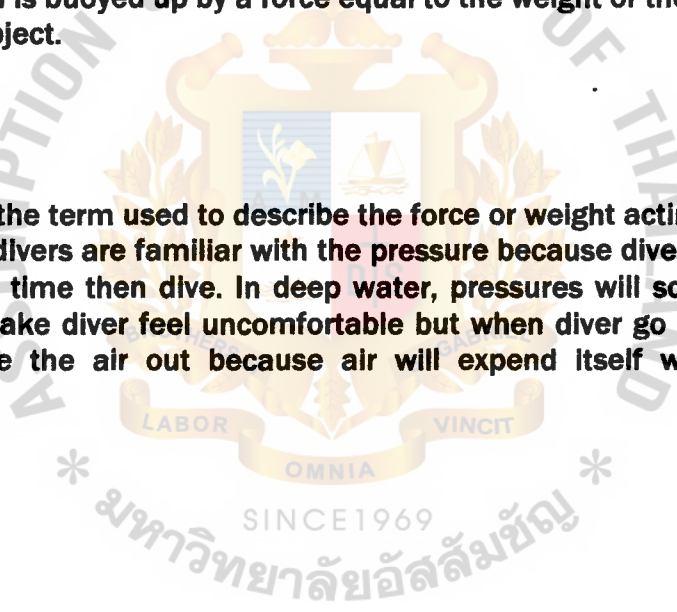
Like light, sound consists of and travels in waves. However, while light waves are made up of electromagnetic energy sound wave are made up of acoustical energy. Unlike light, sound travel best in dense media, such as solid or liquids. In water, diver can hear the sound better than in the air but it's hard to know the direction because sound delay between ears is one quarter of what it is at the surface, a diver perceives sound as coming from all direction at once. Sound travel well in water, one may wonder why human can't talk under water. Vocal cords produce sound by vibrating as exhaled air pass over them but sound wave in air do not transfer efficiently to water.

Buoyancy

The force that cause object to float is called buoyancy. Buoyancy can be described as an upward force exerted on any object placed in a fluid, whether it sinks or floats like Greek mathematician say "any object wholly or partly immersed in a fluid is buoyed up by a force equal to the weight of the fluid displaced by the object."

Pressure

Pressure is the term used to describe the force or weight acting upon some unit of area. Most divers are familiar with the pressure because diver must control the pressure every time then dive. In deep water, pressures will squeeze the air inside body and make diver feel uncomfortable but when diver go up to surface, diver must release the air out because air will expand itself when pressure decrease.



Case study

Hall Diving Institute

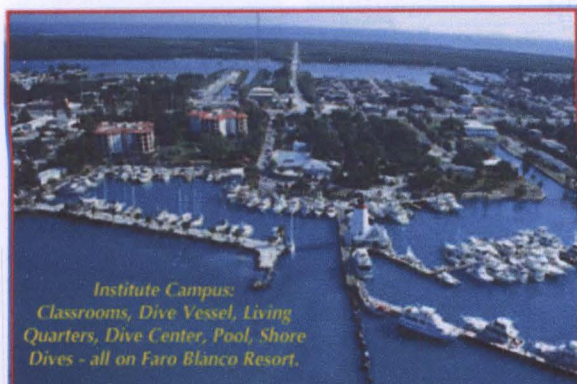


Figure 2.1 The picture of Halls institute from air

The Institute is located in Marathon in the heart of the beautiful Florida Keys off the southern tip of Florida.

Hall's Diving Center provides a lot of REAL hands on training experience. There are REAL cash registers to ring, customers to service, repair department, phone systems, displays areas and compressors, Nitrox blending system, and numerous other equipment to use as part of the training.



Figure 2.2 This picture of map location

From this case, I study about the curriculum of Halls institute. There are many interesting curriculum that they cover everything about diving and There is no diving school in Asia use this curriculum before.

I would like to suggest the new curriculum for project appear on following

Curriculum

Scuba diving instructor training



Figure 2.3 Picture of instructor training

Dive instruction methods at the Career Institute at Hall's are known throughout the industry as state-of-the-art and progressive. Through the Institute's training programs, you easily learn firsthand how to teach diving courses in the classroom, at the pool and in the open water. Psychological methods you learn here are in-depth methods that prepare you to teach any version of diving instruction, anywhere in the world.

Rebreather and DeepTech Diving Instructor Training



Figure 2.4 Picture of dive go down



Figure 2.5 picture of diver Rebreather training

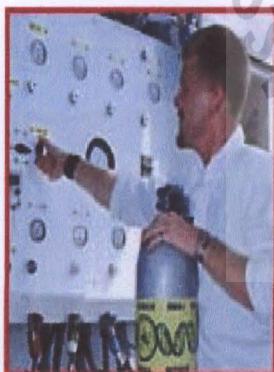


Figure 2.6 nitrox fill-up

State-of-the-art training in the latest recreational dive technology includes training in the use of rebreathers, submersibles, underwater communication systems, technical diving theory and deeper diving techniques. Rebreathers, Submersibles and Tech Diving allow divers to stay down longer, explore more area, reach greater depths while staying within safe diving limits

REBREATHERS are lighter than open-circuit scuba. They are also, quiet - offering a close, stealth approach to marine life; keep you warmer - by providing moist warm air; create constant neutral buoyancy at any depth; and provide a more natural, comfortable diving style. Using the latest state-of-the-art computer technology and Nitrox as a gas, rebreathers easily quadruple your dive time underwater, while cutting your obligations for surface interval or decompression in half

DEEP TECH is recreational diving technology at the ultimate level. The Deep Tech program teaches you to teach all the diving theory associated with safe staged decompression, use of mixed gases, advanced wreck diving, gas blending, underwater communication devices and submersibles. During your training, you practice deep diving techniques, computer dive planning, use submersibles, underwater communication systems and perform simulated stage decompression on deep wrecks and reefs.

Dive master – Boat master Diving accident response technician Training



Figure 2.7 Dive master
And boat master
Training

PROFESSIONAL DIVEMASTERING AND BOATMASTER is guiding divers, subtly enforcing safety, making sure divers have fun, reacting properly in an emergency and crewing on a vessel. During our Divemaster-Boatmaster-DART program, you receive exclusive copyrighted texts and hear lectures on *medical aspects, equipment, diving physics, decompression and environment*. You practice oral open water presentations for boat preps at the dock and at the site. You learn to guide deep wreck dives, night dives, and both shallow and deep reef dives.

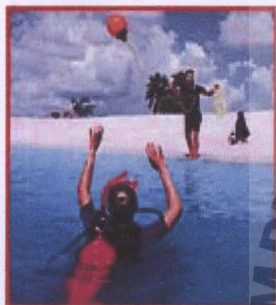


Figure 2.8 Diver rescue
Training

DIVING ACCIDENT RESPONSE TECHNICIAN (DART) is the first responder in the event of a diving accident. Although diving is safe with modern, entry level training, the occasional rescue or accident still occurs. When it does, today's DART trained individual takes charge and reacts with the calm and cool precision of a well prepared diving professional. DART is a full-fledged professional program similar to EMT training, except for diving.

Underwater Digital Photography and Videography Training



Figure 2.9 Photography
Diver

Professional-level photographic skills expand opportunities for employment while adding enjoyment to everyday underwater work activities. Digital photography and videography training at Hall's produces quality results. Outcomes previously only obtainable by the most famous underwater film photographers are now available through a combination of Institute computer edit and photographic training.

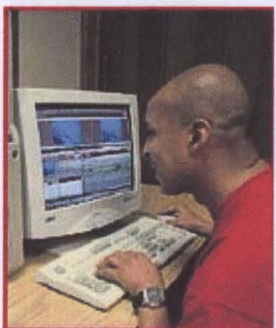


Figure 2.10 Digital photo
Training

Digital Still Photography underwater is a combination of properly setting up and shooting photos of divers and marine life, then going topside and using a computer to enhance them. Through the use of the latest affordable five or better mega pixel cameras and Adobe Photoshop photo editing program, you learn to achieve outstanding underwater photographs fast. You also practice storing photos on CD or DVD, printing photos and downloading them onto the Internet.



Figure2.11 Digital videography
Diver

Digital Videography is a marvelous media for taking underwater movies. Consumer digital video cameras today produce broadcast quality video (520+ lines of resolution) with a minimal investment. The quality is over twice that of most VHS and 8-mm camcorders. At the Institute, you learn to use the latest digital video cameras. You also storyboard, shoot and edit a complete "customer's vacation experience" video using Adobe Premiere and place it on CD, DVD or VHS.

Certified Equipment Repair Technician Training



Figure2.12 Scuba maintenance
Training

Learning to dive is learning to use equipment. There is no realistic way to separate the activity from the equipment. All dive equipment eventually gets worn or corroded and needs repair. To earn a good living as a full-time diving professional, you must be capable of repairing equipment.



Figure2.13 machine maintenance
Training

In our repair program, you easily learn to troubleshoot, clean and reassemble many brands of equipment. You receive exclusive copyrighted texts, lectures and demonstrations on topics that include buoyancy compensators, regulators, valves, and tanks. You learn to troubleshoot compressors, change filters, repair compressor system valves, and efficiently operate an air station.

Resort and Dive Business Operations and Sales Training



Figure2.14 sale service
Training

Any progressive resort, diving business or independent educator takes an active role in creating and promoting continuing activities, equipment sales, classes, dives, charter boat trips and diving travel. A major portion of a dive professional's success comes from skillful operational techniques and the gentle use of the art-of-persuasion.



Figure 2.15 Dive business Training

Whether a full-time professional is persuading a student to do an exercise, sign up for additional training, or recommending equipment, knowing the principles of convincing people on their ideas makes the job easier and the pay better. When acting as a Divemaster-Boatmaster today, the talent involves the skillful use of the power of persuasion to keep things safe and organized.

Figure 2.16 (below) sale manager training



Hall's provides exclusive copyrighted texts along with complete training in *inventory control, record keeping systems, display, work efficiency, air systems, insurance, legal aspects and general operations*. Also covered in the program is *gross profit management, rental procedures, travel booking, dive courses, vacation packages, equipment, reservations, group charters and cash register procedures*. The list of skills you acquire at the Institute goes on and on. The Institute at Hall's program deals with the psychological aspects of persuasion in all areas of sales, from selling your own *dive courses to vacation packages and equipment*. What you learn at the Institute at Hall's is not the hard sell. You learn that skillful persuasion selling, as taught at the Institute, is pleasant and productive for you and your customer.

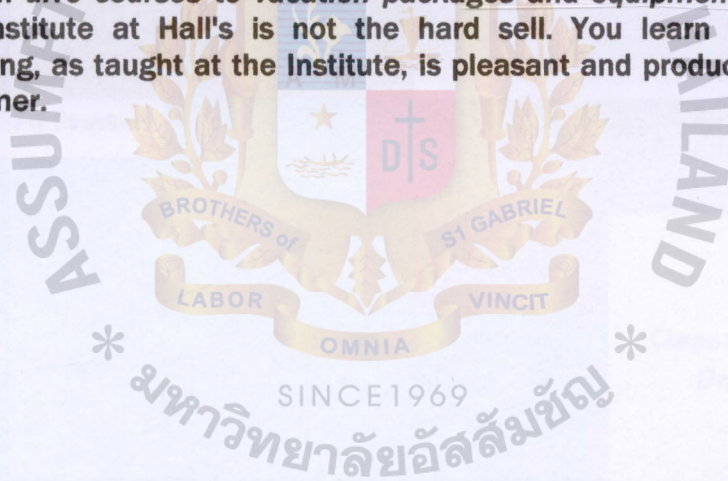


Figure 2.17 Training of Minnesota school

Every room is built by the function of each area. Size of each area is requiring for the function. Some function in this school is interesting for my project. The first function that I interest is show room

Minnesota School of diving



Figure2.17 Picture of Minnesota school of diving

Minnesota school of diving has total area about 2,500 sq.m. All function of this building closely with this project. So, in this case study I interest with the function and area of each space.

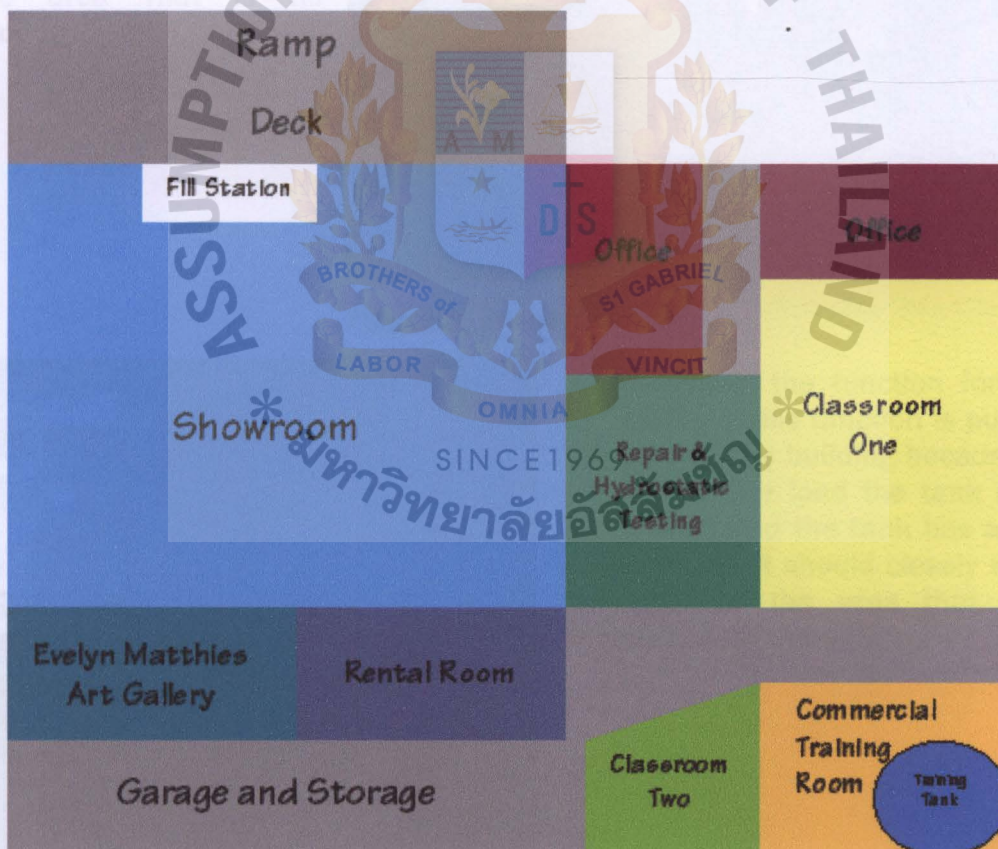


Figure2.18 Zoning of Minnesota school

Every space is linked by the function of each area. Size of each area is requiring follow function. Some function in this school is interesting for my project. The first function that I interest is show room



Figure 2.19 picture of show room

In show room, except selling service. There is another service function that combines to use in the same area That is fill station



Figure 2.20 picture of show room



Figure 2.21 picture of fill station

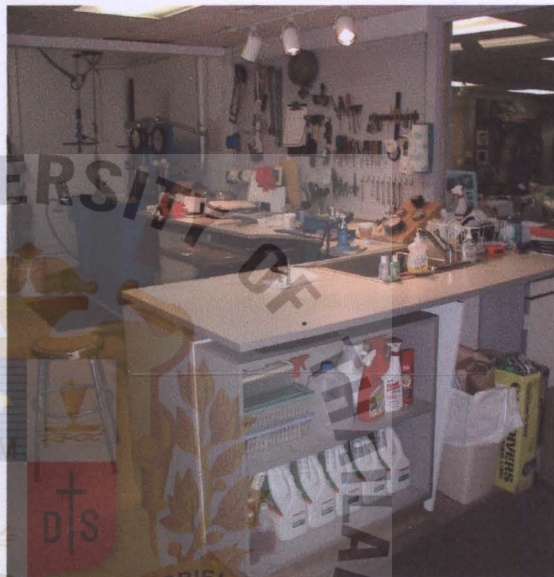
Fill station is the function for fill the air tank. This function is put at the front of the building because it needs area for load the tank and for delivery and the tank has a lot of weight so, it should closely with car park or the area that the vehicle can go through.

Another function that close with show room is repair and hydrostatic testing



Repair & Hydrostatic area is the another service that use for maintenance scuba equipment and for check tank status. This area can support both customer and school equipment.

Figure2.22 Repair & Hydrostatic area(above)
Figure2.23 another side for show the hydro static area (Right)



From Zoning, the function that put on the right side of repair area is class room

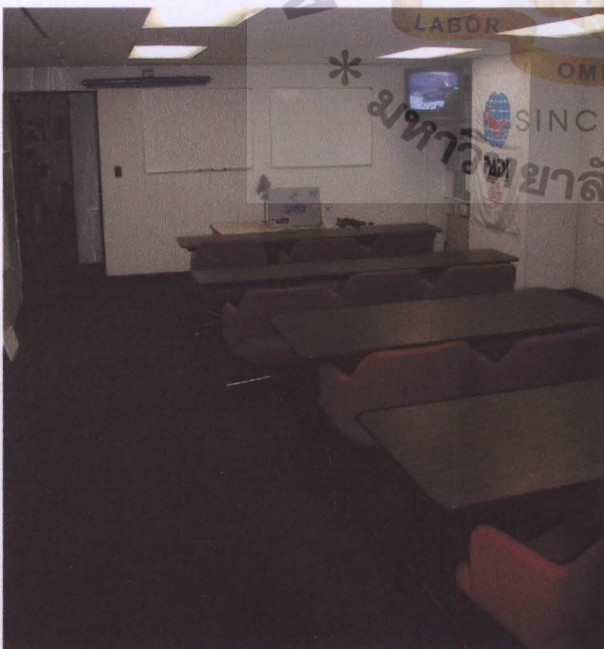


Figure2.24 Class room

Class room has a large area but less than show room. This class can contain 12 students. It include the equipment for help in teaching that has a television, projector and white board but this advantage of this room is whoever sit at last roll right corner because it hard to see television and white board.



Figure2.25 class room from front side



Figure2.26 Training tank

Rental room is the area for beginner student or tourist that has no own equipment. Generally, The equipment will use for student to training in tank.



Figure2.27 Rental room

Office is stay at the front of building for easy to contact and information for people who want to use the service in this building.

OK marine pro



OK marine pro is located in Japan. It is a three floors building including with the general function like Minnesota school of diving. Actually, this building has a special part for attract people to interest in diving easily. The interesting part is the training tank inside the building.

Figure2.28 Ok marine pro building

This pool has area about 240sq.m. Divide deep level to two levels. First level has deep about 1.2m another level has deep 5.0m. Area around the pool can use for jumping practice.

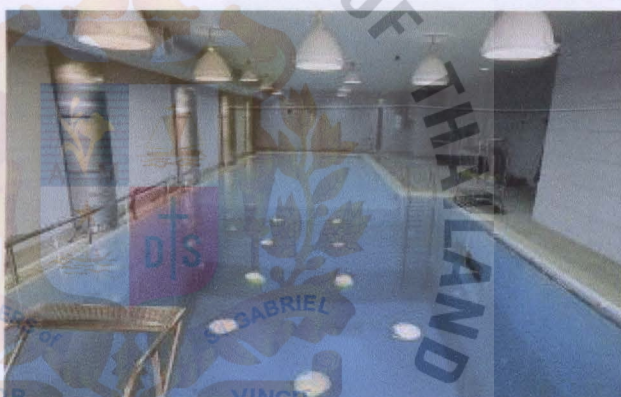
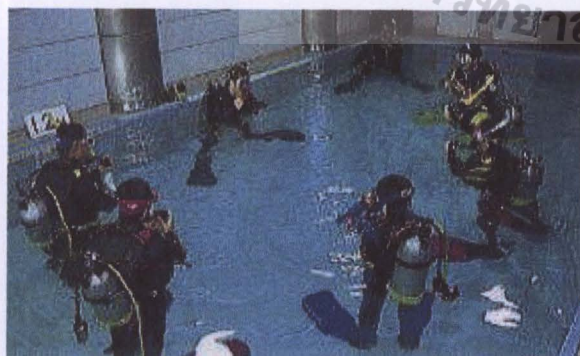


Figure2.29 Training pool in side building



At shallow level, Instructor will use for beefing and train some practice Before they go to deep level

Figure2.30 Picture of shallow level in training pool



Figure2.31 Picture of deep level in training pool

At the deep level, instructor will let the student to train the practice. It's imitate the sea for make diver familiar before their go to the sea.

There is an area for practice about go up & down in the water. So, the pool have to deep enough for train this practice. It should deep over than 3m over.



Figure2.32 Picture of training area at deep water

Other function is including



Class room

Figure2.33 Class room(Left)

Figure2.34 Class room(above)

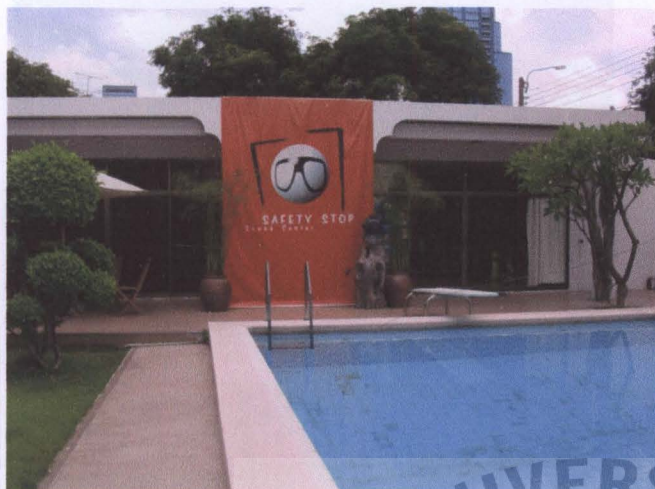


Figure2.35 Retail shop



Retail shop

Safety stop, Thailand



This shop is located on soi. 19 Eakamai RD.

This is the one of favorite diving in Thailand. I use this case for compare with the diving shop of other for looking for problem and lacking.

Figure2.36 Front of safety stop diving center



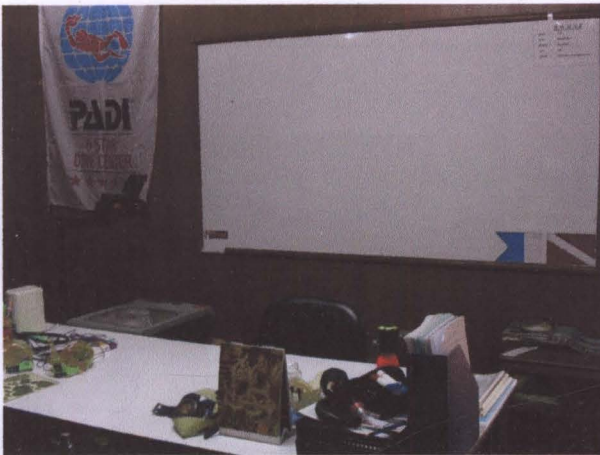
Function is including

Retail shop is smaller than the Minnesota because the limit of area and most diving shop in Thailand will not sale every band or equipment in one shop but they will choose couple band to sale.

Figure2.37 Counter in retail shop



Figure2.38 other side in retail shop



Class room has an equipment for use to teach like Minnesota but the area is different

Figure2.39 front of class



Area in class room is too small for support the group student. They will emphasize for individual student more than group student.

Figure2.40 Class room

Atmosphere around the shop



Figure2.41 The circulation between the shop and pool(above left)

Figure2.42 The rest area(below left)

Figure2.43 pool (above)

Dive master, Thailand



This shop is located on Asoke RD.

The favorite diving shop in Thailand. Dive master has more area than safety stop. This shop will emphasize about product and retail shop more than safety stop.

Figure2.44 Front of Dive master shop



Figure2.45 Reception Counter (Above left)

Figure2.46 display (middle left)

Figure2.47 Counter service (above)

Figure2.48 Class room (below left)



Most of area of dive master will use for retail more than other part. Like safety stop, dive master just sale a couple band of equipment and area for maintenance service and fill station also. Other function is include Class room and office area

Aqua Gallery

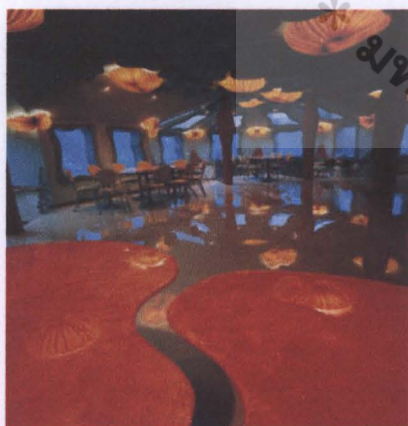


Aqua gallery will design the lighting and furniture from the figure of underwater creature. In this case, I study about the character of the design for use in my project.

Figure 2.49 Aqua gallery lamp design
Figure 2.50 Lamp in the hall



Aqua gallery was design for Red sea Restaurant the underwater restaurant by use the concept underwater.



The design is not just a lamp or furniture but they design column ceiling and another thing is the color that can make feeling closely with the real sea

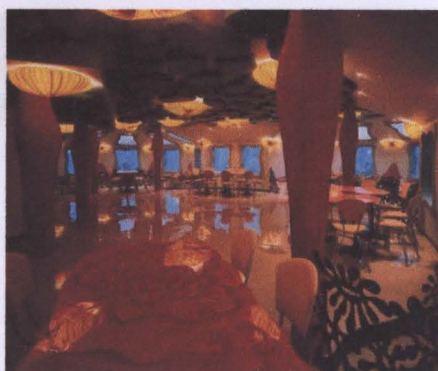


Figure 2.51 hall restaurant

Figure 2.52 Hall restaurant
(Above right)

Figure 2.53 Circulation (below right)

Chapter 3 : Project Facts

Site analysis

Administration Building is located next from Phuket aquarium. Approach the site has the space of landscape architecture before enter the main building.

In front of the building located the ground play and car park that receipt the tourist. Beside the site is the mount in same area located the Staff's Building of the Institute.

The character of the building is reinforce concrete building with u shape. covering by white painted and small rectangular windows setting in the facade and rise up the floor of building 1.50-2.00 Meter that for the electrical, water and air supply.

Site location

Location: Panwa cape, Phuket Thailand

Surrounding site

North - The way to Phuket aquarium

South - Andaman Sea

East - institute house

West - Andaman Sea

Site Map

Accessibility

Transportation

-Bus or private car by pass the formal street number 4

-Airplane from the Bangkok Airport to Phuket International Airport

Environments and nodes

Panwa bay locates in the Seaport at deep ocean zone and the site far from the metro city 8-9 kilometers

Surrounding Location

-Besides the building is Panwa bay

-From front of the building can go to the port

-The front of the building is connecting with Phuket aquarium

Site plan & Surrounding

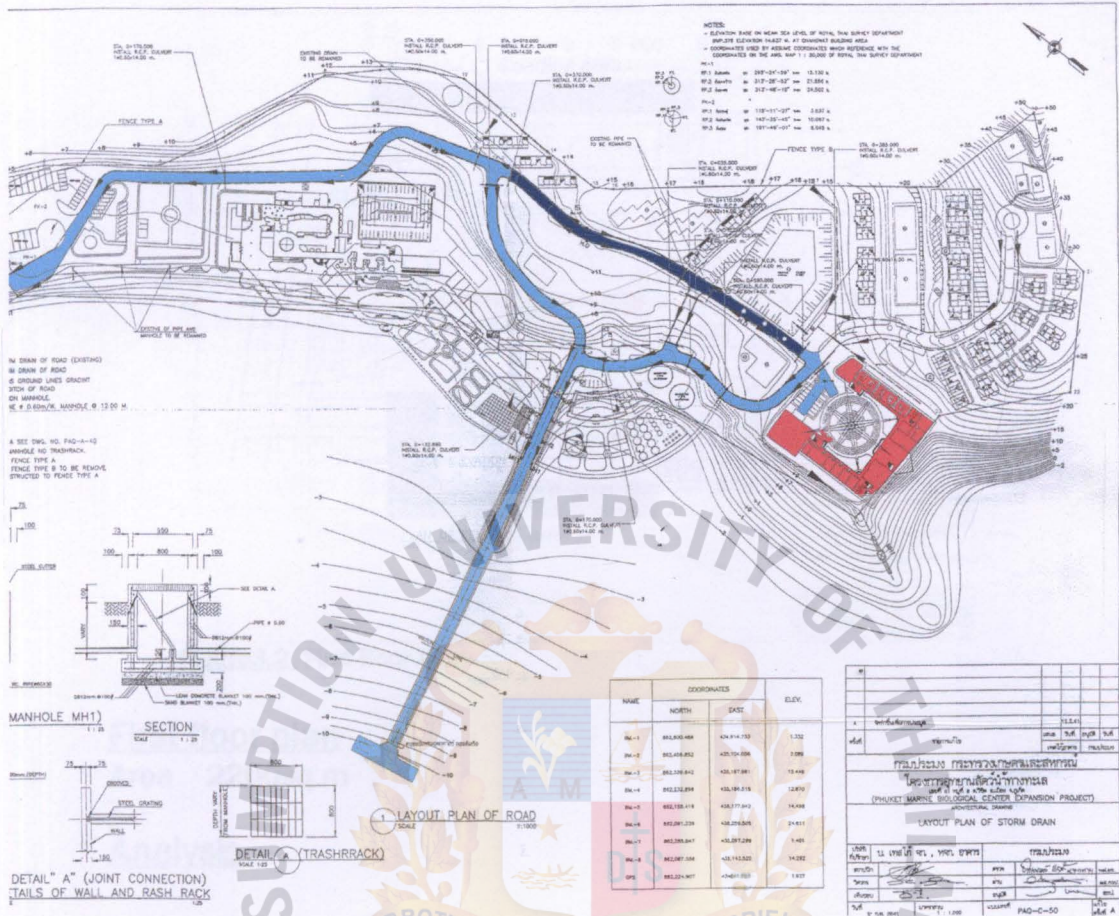


Figure3.1 Site plan and surrounding

Following the key plan, the main entrance is located on the left hand side. Move from the main entrance, follow the sky blue line about 600m on the right hand side is the Phuket aquarium. Continue moving about 1,200m on the right hand side is the port and move another 600m to the site located.

This site is located on the tip of Panwa cape. There are two open side that turn to the sea. The west side and south side are the side that turn to the sea. So, both side will face with the wind from the sea.

Panwa use to be a popular place. It can attract tourist by the aquarium but now it lacking of investment to develop and it has effect to the economy of this area. So, for development of this area, There is a interesting place or building that can support the activity of tourist. Hence, I try to develop this area to be a center of diving because it has supporting from surrounding such as the port and the popular dive site as similan island.

Building analysis

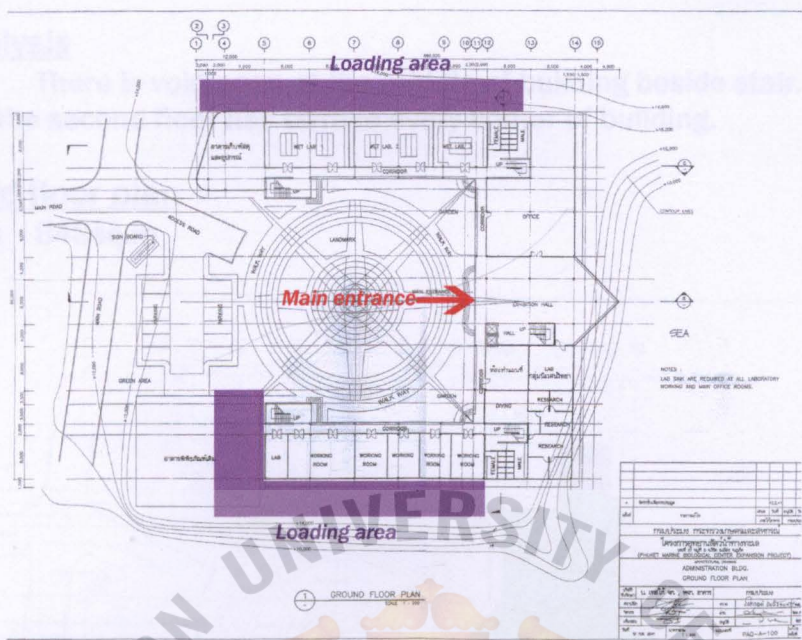


Figure3.2 First floor plan

First floor plan

Area 2200sq.m

Analysis

- There is only one main entrance in middle of the building. Loading area stay at both sides of the building.
- There is a circle garden between building and car park

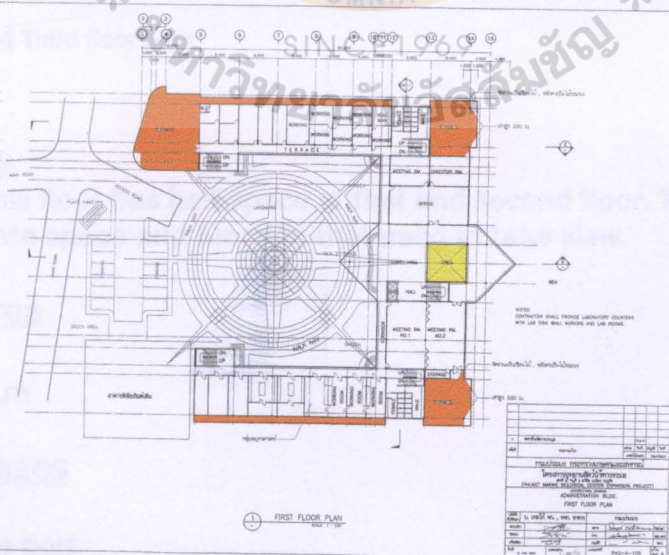


Figure3.3 Second floor plan

Second floor plan

Area 2200sq.m

Analysis

There is void open at the middle of building beside stair. Around building at the second floor has terrace every corner of building.

Third floor plan

Area 848sq.m

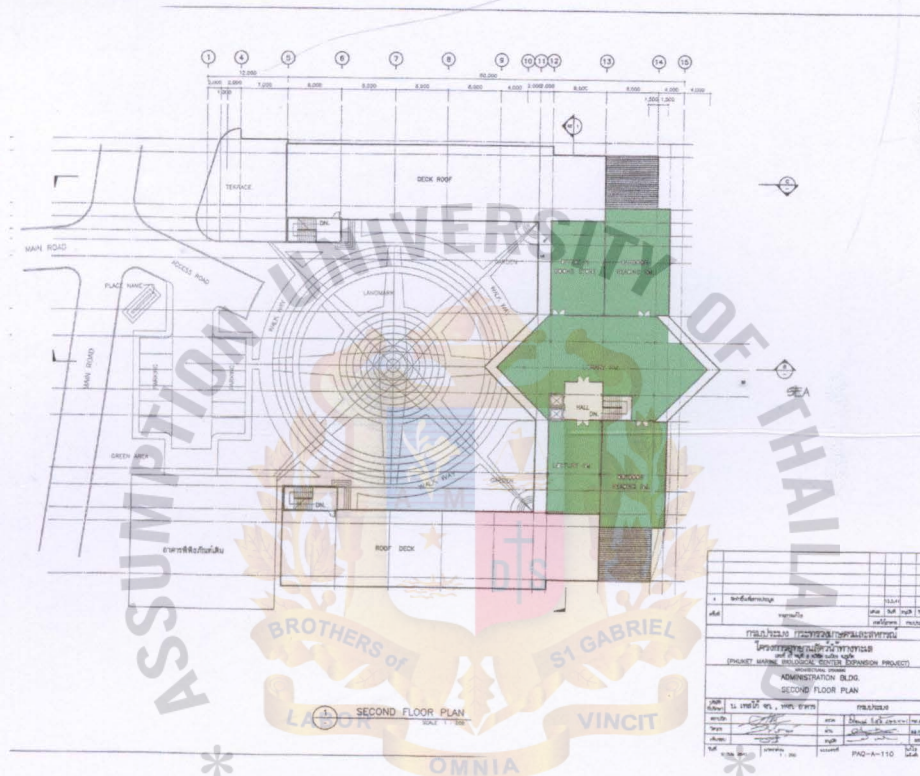


Figure 3.4 Third floor plan

Analysis

This floor has half space of first and second floor. This area can use to be a private space and function that need to take view.

Total Area

5248 sq.m

Advantages

- Near the port
- From this location, tourist can conveniently depart to dive site or island around Phuket
- The character of building is easy to control user and divide space.

Disadvantages

- The road should come through the entrance because car park is far from building
- It should have a sub entrance for support the activity of tourist when they come to use space
- It should have a space for support the when they come to drop tourist



Chapter 4 Data Synthesis and Programming
Organization chart

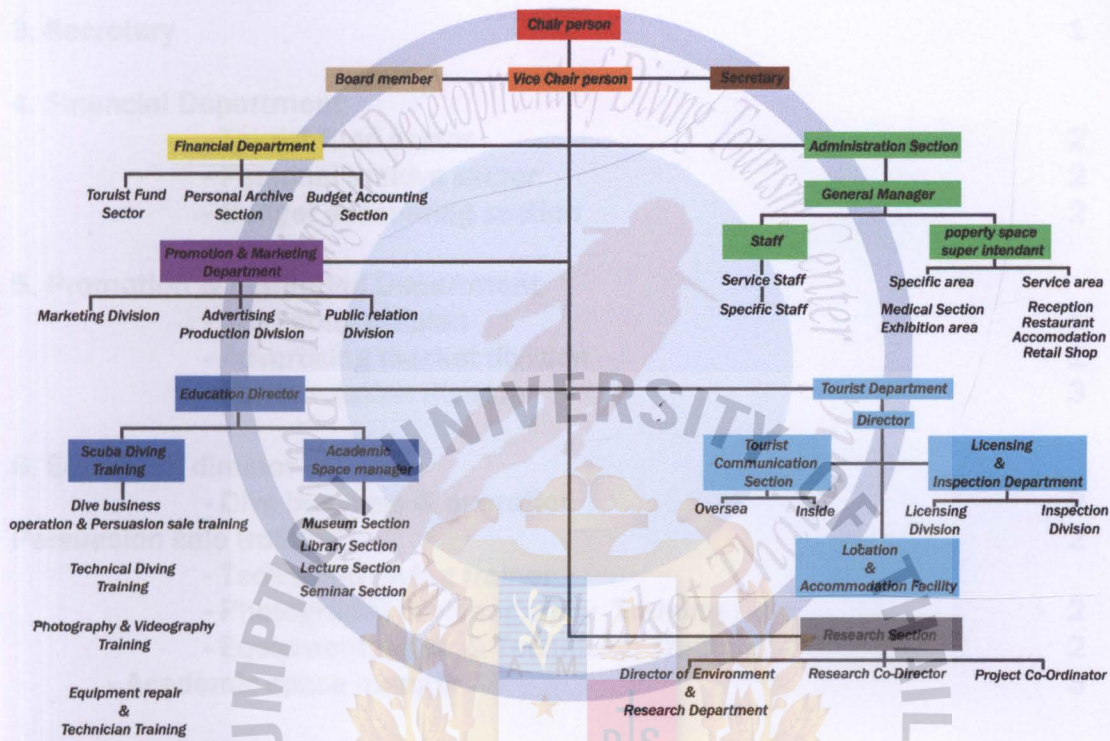


Figure 3.5 Organization chart

Human Resource

1. Chair person	1
2. Vice chair person	1
3. Secretary	1
4. Financial Department	
- Tourist fund sector	2
- Personal archive sector	2
- Budget accounting section	2
5. Promotion & Marketing Department	
- Marketing division	1
- Advertising market division	1
- Public relation division	3
6. Education director	
- Dive business & operation	2
Persuasion sale training	2
- Technician diving trainer	
- Photography & videography Training	2
- Equipment repair & Technician Training	2
- Academic space manger	3
7. Administration Section	
- General manager	1
- Property space super intendances	
- Service area	4
- Specific area	3
8. Tourism director	1
- Tourist communication section	2
- licensing & inspection department	4
- Location & accommodation facility	3
9. Research section	
- Director of environment & Research department	1
- Research Co-Director	1
- Project coordinator	1
Total	46

User behavior

From this project, I can divide user to be 5 types. Every type will be a different purpose for using the space. I would like to introduce 5 types of user following

1. The beginner student

The object of this group is coming To study. The picture will show about the Behavior from they pass through reception, go to class after class they go to training in pool. Other part is an option that they can select for do or not. The main purpose is finished in the first line.

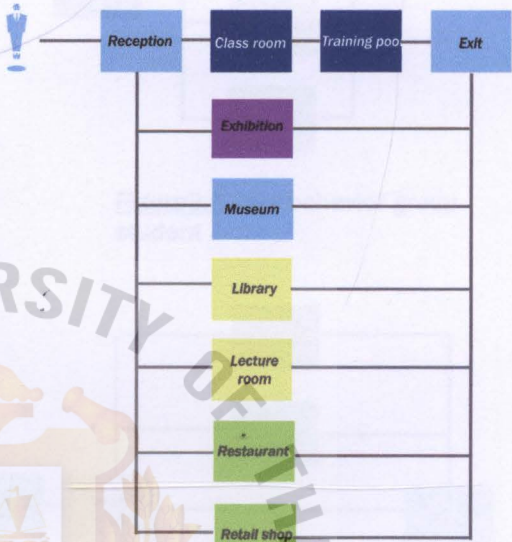


Figure3.6 User behavior beginner study

2. Advance student

This group has almost the same purpose with group 1 but it different in curriculum that they choose for study. In the other function is the option like group number 1

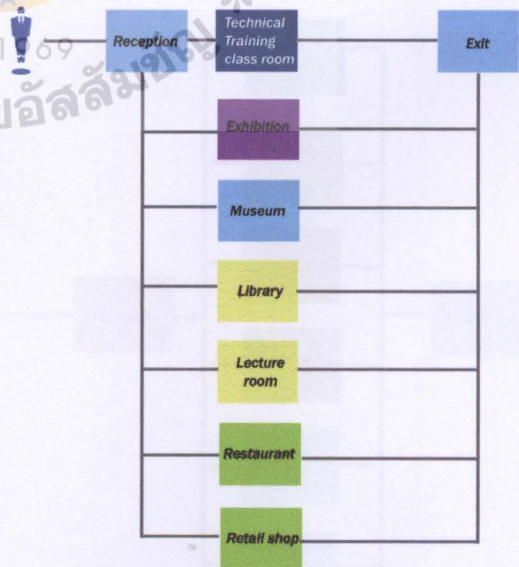


Figure3.7 user behavior advance student

3. The group student

there is different purpose with group 1 and 2 because this group most come with the special event such as lecture or seminar. Mostly this group is the student from university that come for research and study

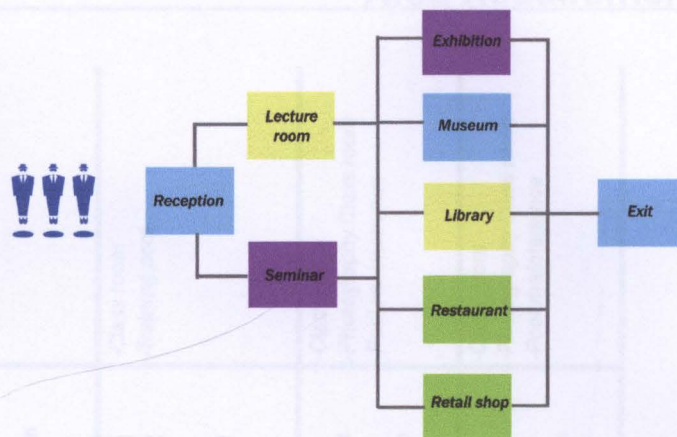


Figure3.8 user behavior group student

4. Group of tourist

The main objective is come for waiting or shopping. This group will not do anything more so, option is not much like other group

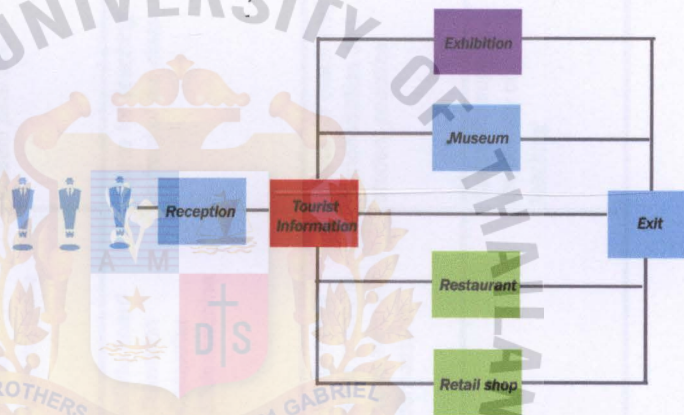


Figure3.9 user behavior group tourist

5. Staff

This group has a duty to take care every area.

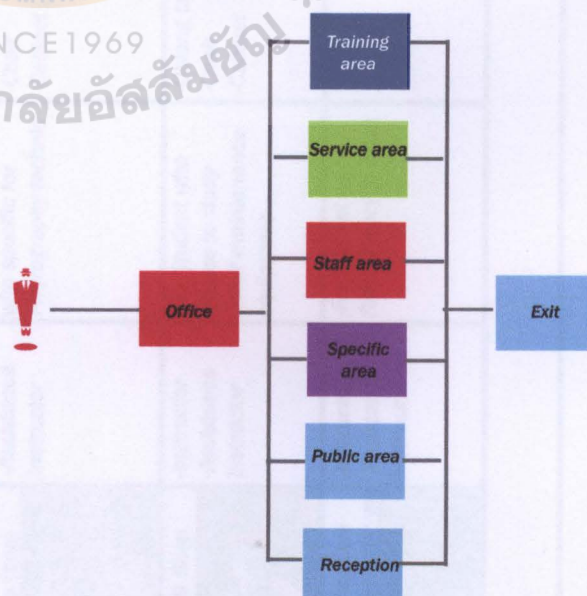

















Figure 4.0 user behavior group staff





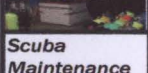

Training Area Requirement							
Area	Staff	Users	Furniture Requirement	Equipment Requirement	Spatial Requirement	Area (sq.m)	Adjacency Requirement
 Class room	-Instructor -Assistance Instructor	-Beginer Student for open water course	-Oblong table -Chair -Cabinet	-White board -Television -Model -Slide machine	-Space for Teaching in front of the class	17 users 36.4 sq.m	-Training Pool
 Technical Class room	-Instructor -Assistance Instructor	-Advance student and High level student	-Oblong table -Chair -Cabinet	-White board -Television -Model -Slide machine	-Sapce for teach and demonstration and student peactice	17 users 41.4 sq.m	-Class room -Training pool
 Photography Class room	-Instructor -Assistance Instructor	-Advance student who specific for Photography technic	-Oblong table -Chair -Cabinet	-White board -Television -Computer -Slide machine	-Space for Teaching in front of the class	17 users 37 sq.m	-Class room -Training pool
 Work Shop	-Instructor -Assistance Instructor	-For Student who choose to study about maintenance equipment	-Oblong table -Chair -Cabinet	-White board -Slide machine -Equipmetn for demonstrat	-Sapce for teach and demonstration and student peactice	12 users 37 sq.m	-Class room -Photography Class room -Pool maintenance
 Training pool	-Instructor -Assistance Instructor	-For student who finish theory in class			-Space for support the activity of teaching	17 users 128 sq.m	-Class room -Photography Class room -Pool maintenance

Public & Service Area Requirement							
Area	Staff	Users	Furniture Requirement	Equipment Requirement	Spatial Requirement	Area (sq.m)	Adjacency Requirement
Reception & Lobby 	-Public Relation	-Visitor or student	-Bench -Sofa set	-Computer -Multimedia screen -Circulation map	-Space for support The tourism activity	50 user 175 sq.m	-Office -Retail shop
Museum 	-Dive Master	-Visitor or student	-	-Display Information -Computer station	-Area around display and area between display	40 user 176 sq.m	-Reception & Lobby
Restaurant 	-Waiter -Waitress -Manager	-Visitor or student	-Dining set -Cashier service station	-Dining supplies -TV screen -Information for order	-Circulation for staff and customer	50 user 286 sq.m	-Kitchen -Hall
Retail shop 	-Manager -Retailer	-Visitor or student	-Display stack for equipment	-Cashier -Product	-Space for show the product and It has to support to customer perspective	320 sq.m	-Reception -Accommodation area -Fill up area -Maintenance service
Accommodation 	-Maid	-Visitor or student	-Bed -Cabinet -Seating set	-Lamp -Telephone -Computer	-Private space and comfortable and include working space	11 rooms 317 sq.m	-Retail shop -Hall
Study Area Requirement							
Library 	-Librarian Staff	-Visitor or student	-Circulation desk -Desk -Information counter -conference table -Book shelf -Chair -Internet station -Multi supplies	-Book -Vcd -Vdo -Computer	-Space that divide from duty and private space	90 users 384 sq.m	-Lecture room
Lecture room 	-Instructor	-Student	-Lecture Chair -Long table -Chair	-TV screen -Amplifier -Media supplies	-Space for lecture and space between chair	40 users 128 sq.m	-Library

Specific Area Requirement

Area	Staff	Users	Furniture Requirement	Equipment Requirement	Spatial Requirement	Area (sq.m)	Adjacency Requirement
 Medical & Chamber room	-Medic -Assistance	-Customer -Student	-Working table -Chair -Cabinet -Bed	-Medical supplies -Chamber and control -Computer	-Prepare space for emergency moment	80 sq.m	-Reception -Main entry
 Exhibition	-Dive master	-Visitor & Student	-Display -Public seat	-Computer station -Display Information	-Area around display and perspective of customer		-Reception -Hall
 Seminar room	-Instructor -Assistance	-Visitor & Student	-Conference table -Chair -Cabinet	-Slide machine -Projector -Setero -Computer	-Space for lecture and walk around the room		-Museum

Staff Area Requirement

 Office	-Officer	-Officer	-Office table -Computer station -Meeting table -Chair -File shelf	-File -Computer, Printer -Office supplies	-Space has to comfortable for walk from table to file shelf	34 users 283.1 sq.m	-Reception -Class room
 Pool maintenance	-Mechanical -Assistance	-Mechanical -Assistance	-Cabinet -Chair	-Pump -Pool mianrenance supplies	-Space for keep and clean the equipment		-Training pool
 Main control	-Mechanical -Assistance	-Mechanical -Assistance	-Cabinet -Chair	-Controller -Main supply	-Dextrous space for moving and control		-Office
 Kitchen	-Chef -Assistance	-Chef -Assistance	-Cabinet	-Kitchen equipment	-Dextrous space for moving and cook		-Restaurant -Loading area
 Tank Fill up	-Technical -Assistance	-Technical -Assistance	-Counter	-Decanting tank -Compressor	-Charging area		-Reatail shop -Entry
 Scuba Maintenance	-Technical -Assistance	-Technical -Assistance	-Oblong table -Cabinet	-Scuba maintenance supplies	-Space for keep the equipment and easy to use		-Retail Shop -Training pool

Bubble diagram

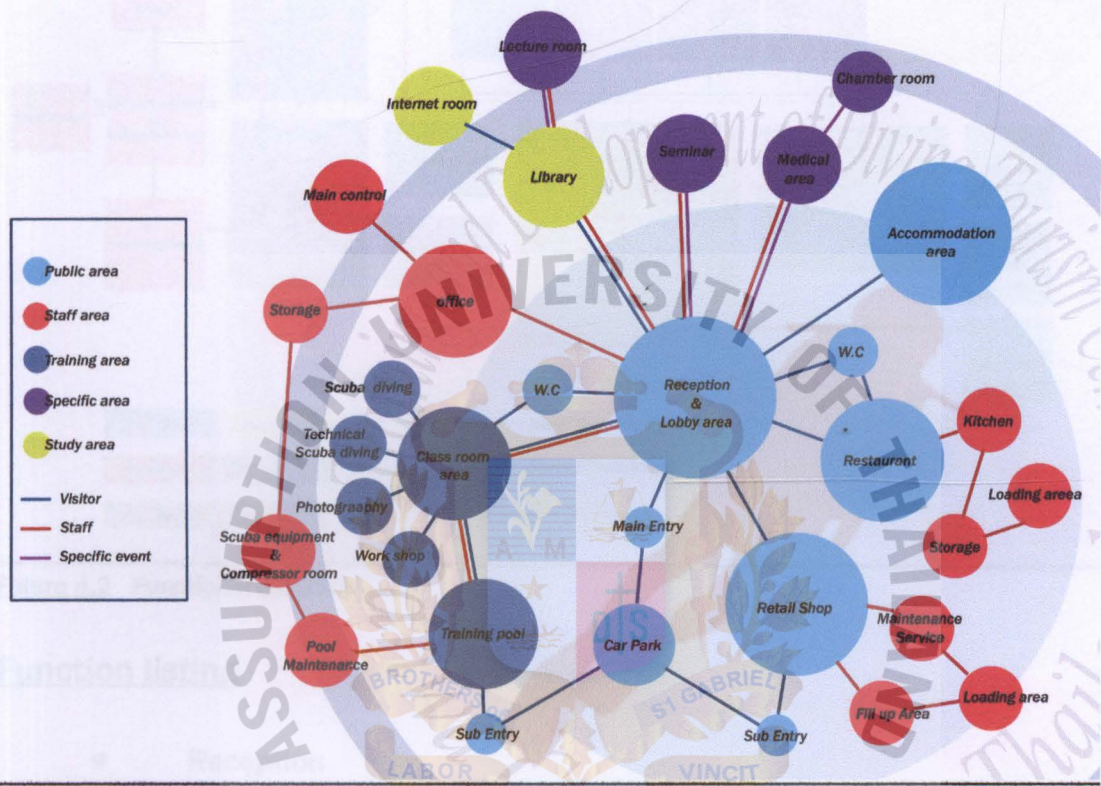


figure 4.1 Bubble diagram *

มหาวิทยาลัยอัสสัมชัญ
SINCE 1969

Functional diagram

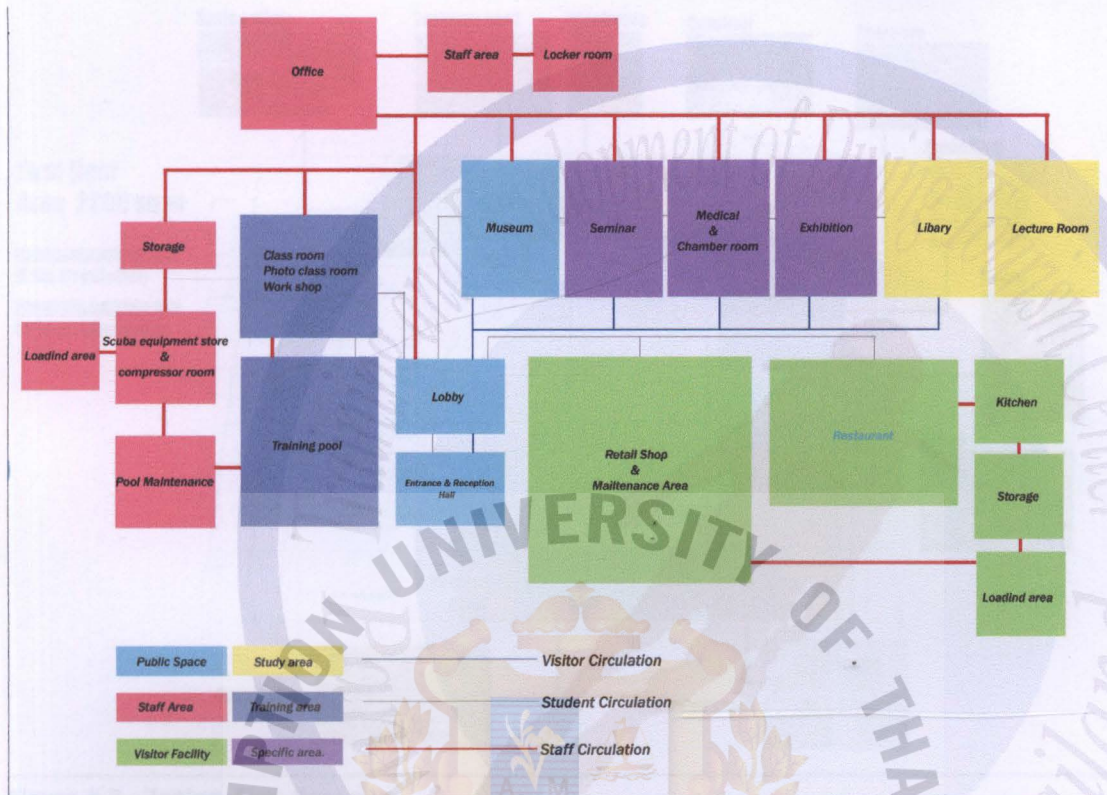


Figure 4.2 Functional diagram

Function listing

- Reception
- Waiting area
- Temporary exhibition
- Permanent exhibition
- Class room
- Training pool
- Computer lab
- Retail shop
- Maintenance area
- Medical & Chamber room
- Accommodation area
- Restaurant
- Computer service
- Library
- Office

Zoning

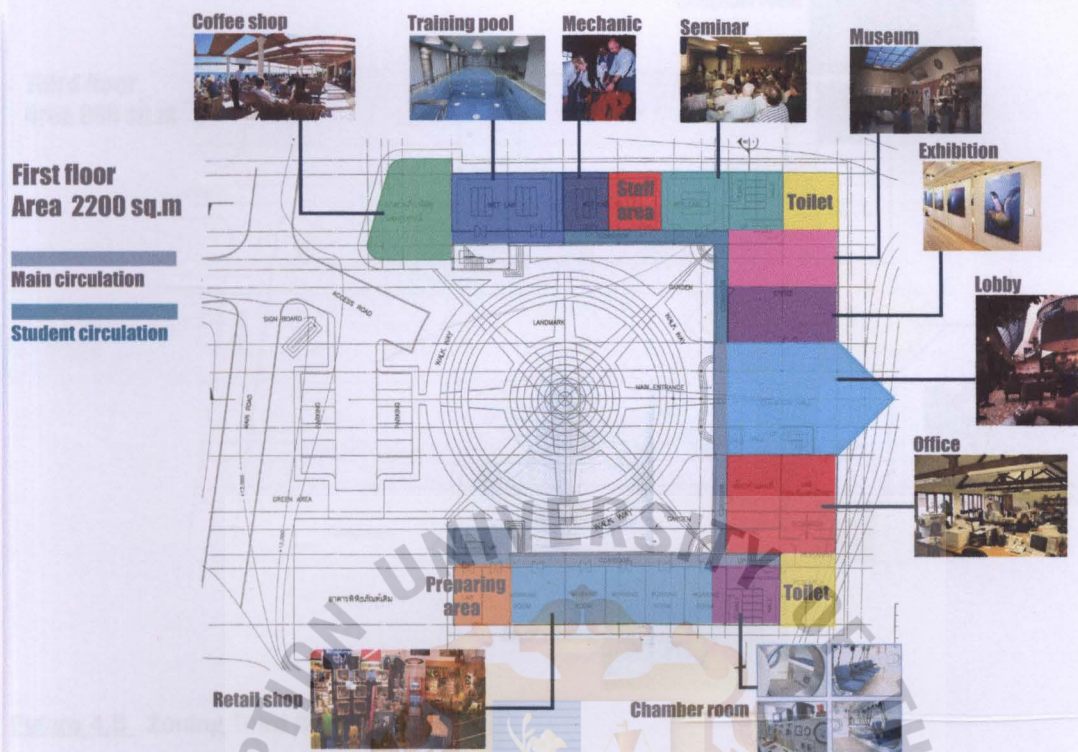


Figure 4.3 Zoning First floor plan

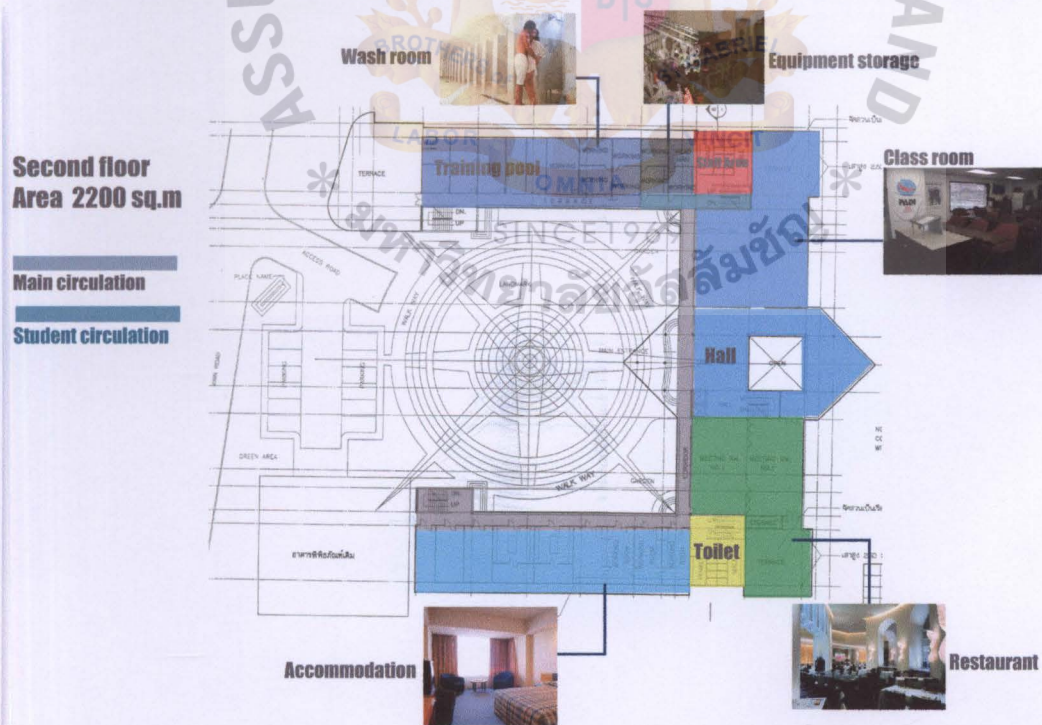
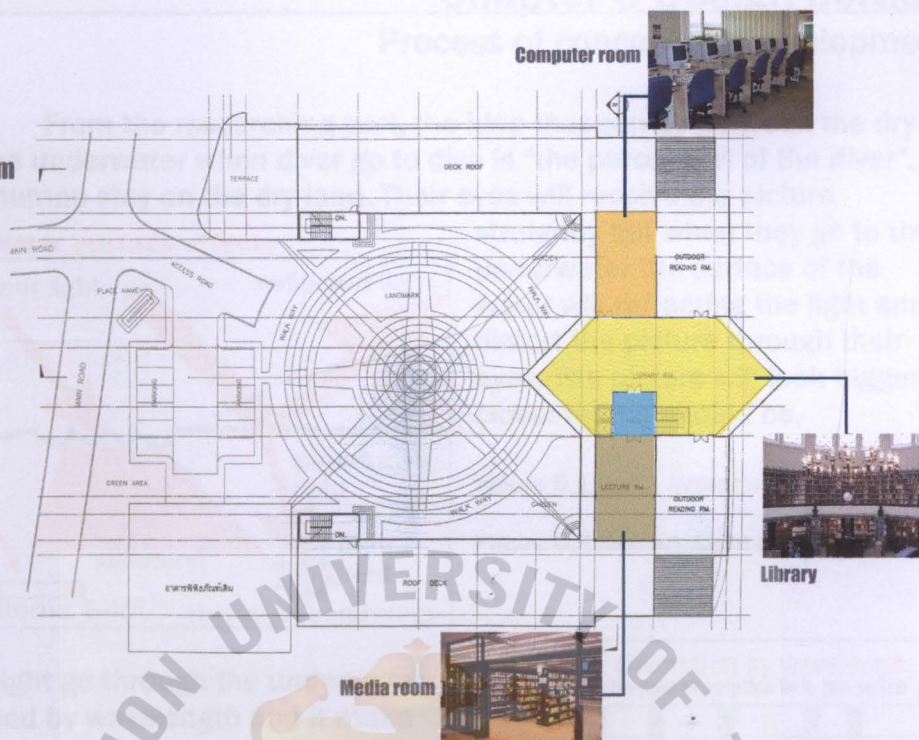


Figure 4.4 Zoning Second floor plan

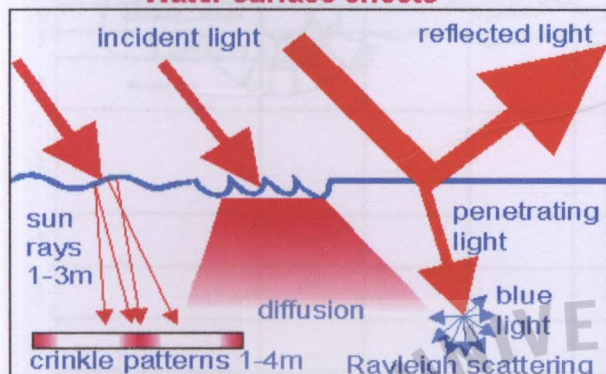


Chapter 5 Design portion

Process of conceptual Development

From the researching part, the idea that can go-between the dry land and the underwater when diver go to dive is "the perception of the diver". When the human stay on the dry land. Their eyes will receive the picture

Water surface effects



straightly but when they go to the underwater the surface of the water will refracting the light and distort the picture through their eyes. The picture will look bigger or closer than it should be.

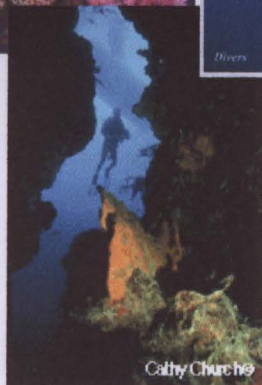
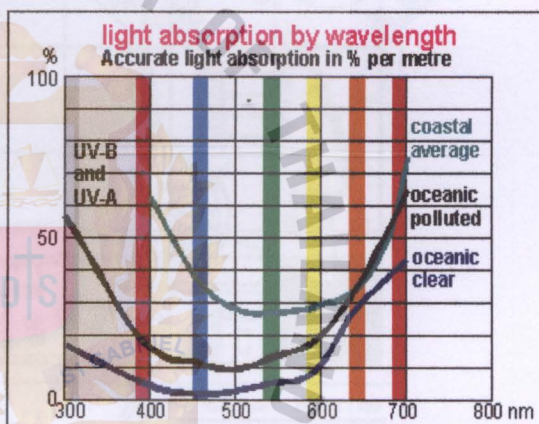
Figure 5.1 (left) Water surface effects

Figure 5.2 (below) Light absorption

When the light go through the underwater It is absorbed by wavelength and it make every thing has a blue color because the blue color has a longest wavelength than other color.

In the project, Surrounding is referring to the dry land and the building is referring to the underwater. So the façade of the building is the water surface.

When it refracts the main circulation is refract follow the façade also. In the building use the light absorption to show the level of the water from the first floor to the third floor.



Use the character of the underwater such as the coral, Cave, bubble and other to design for make the author feel like they are diving.

Lay out Planning

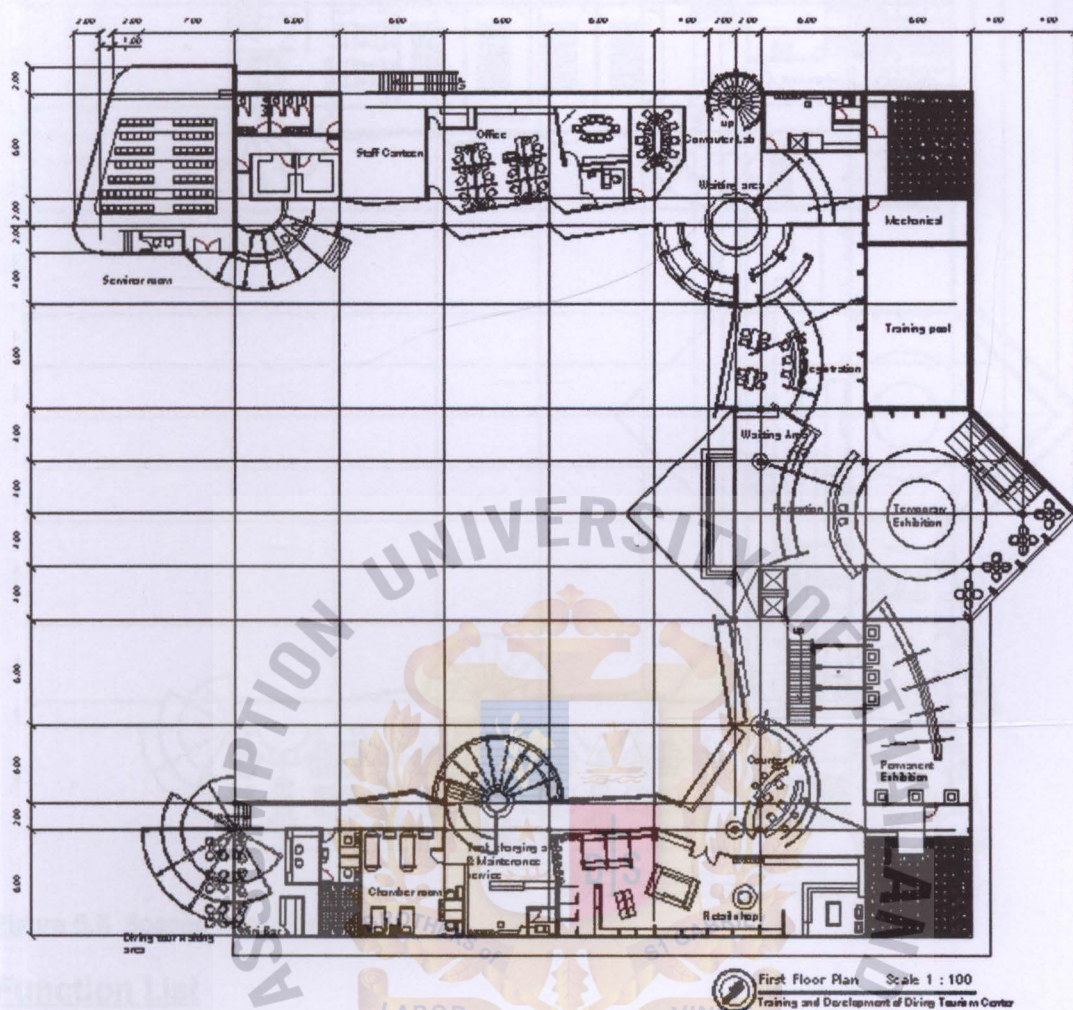


Figure 5.4 First floor plan

Function List

First floor plan

- Reception
- Temporary Exhibition
- Permanent Exhibition
- Coffee corner
- Registration counter
- Meeting area
- Computer Lab
- Office
- Staff area
- Seminar room
- Counter TAT
- Retail Shop
- Maintenance Scuba equipment & tank fill up service
- Medical & Chamber room
- Diving tourist waiting area

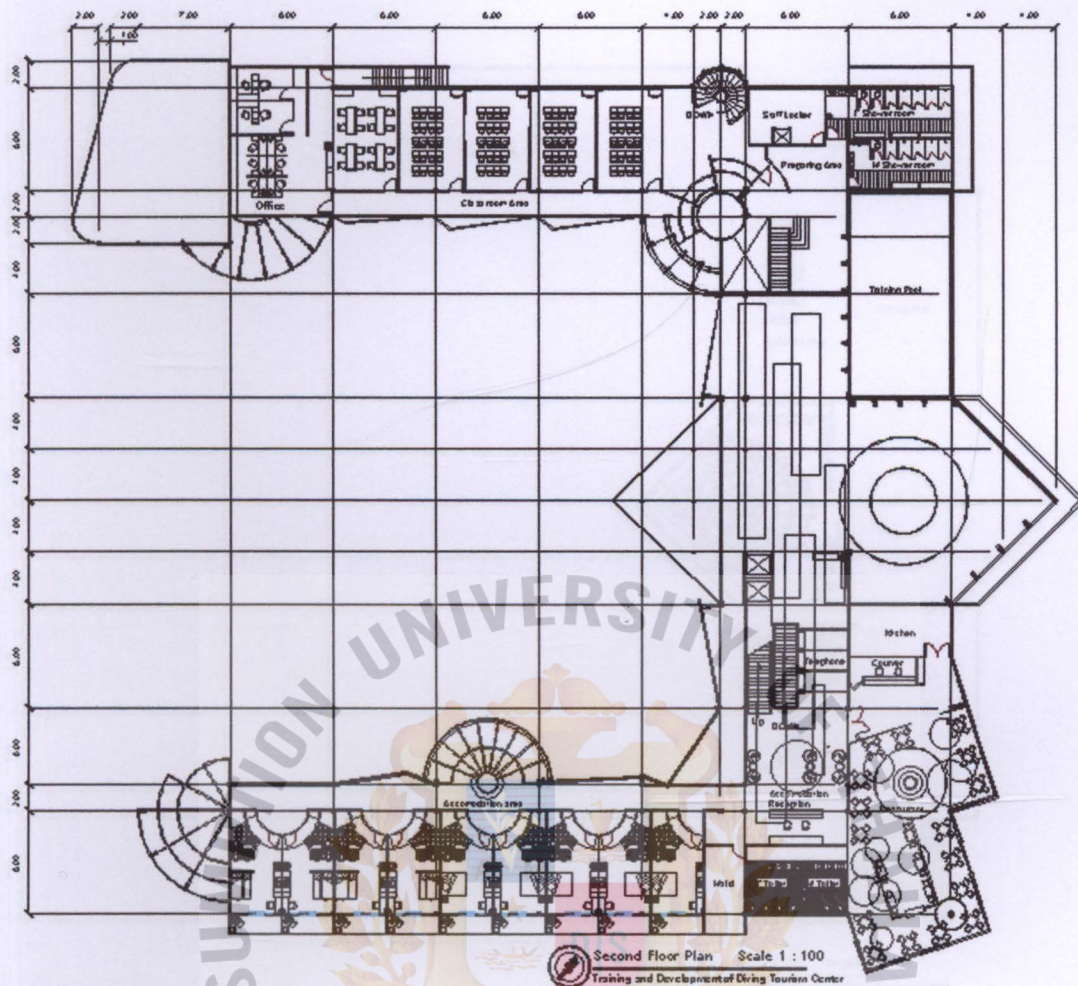


Figure 5.5 Second floor plan

Function List

Second floor plan

- Hall
- Class room
- Preparing area
- Office
- Accommodation waiting area
- Accommodation counter
- Restaurant
- Accommodation area

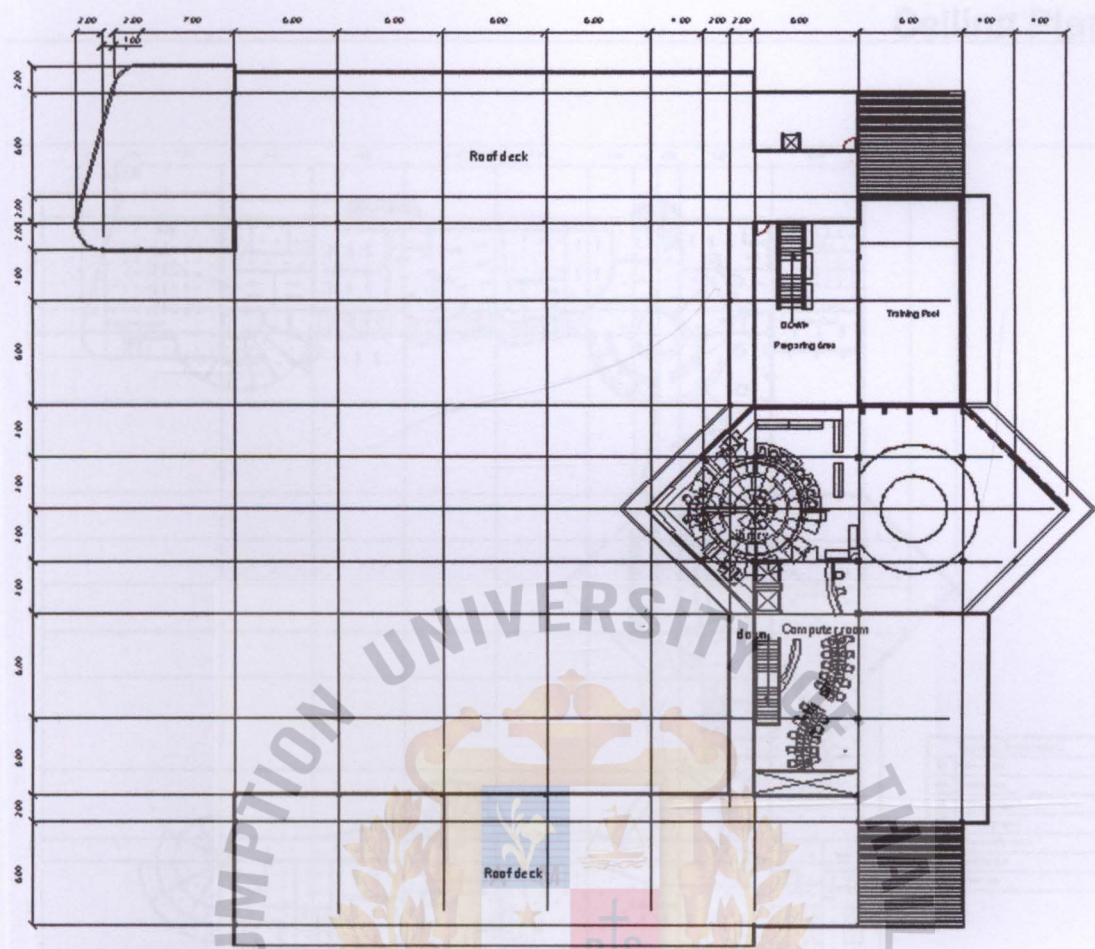


Figure 5.6 Third floor plan

Function List
Third floor plan

- Technical teaching area
- Computer service
- Library

Ceiling Plan

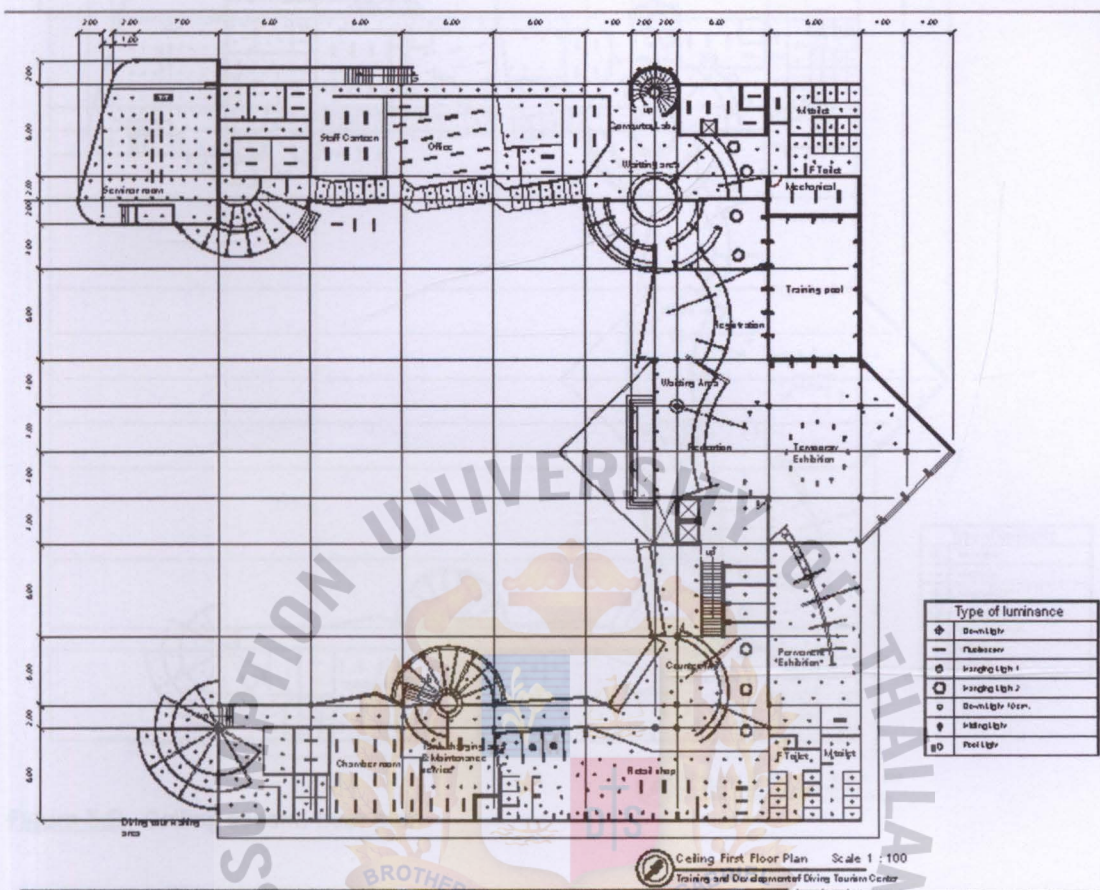


Figure 5.7 Ceiling First floor plan

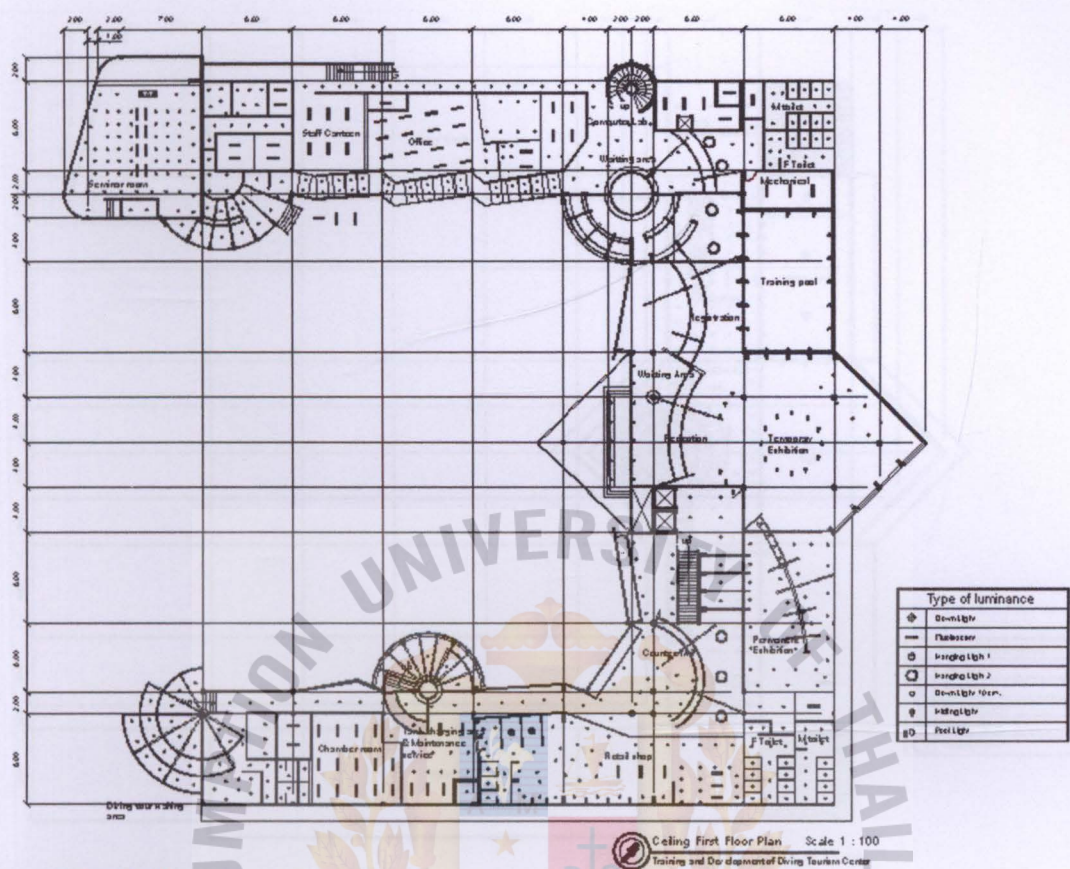


Figure 5.8 Ceiling second floor plan

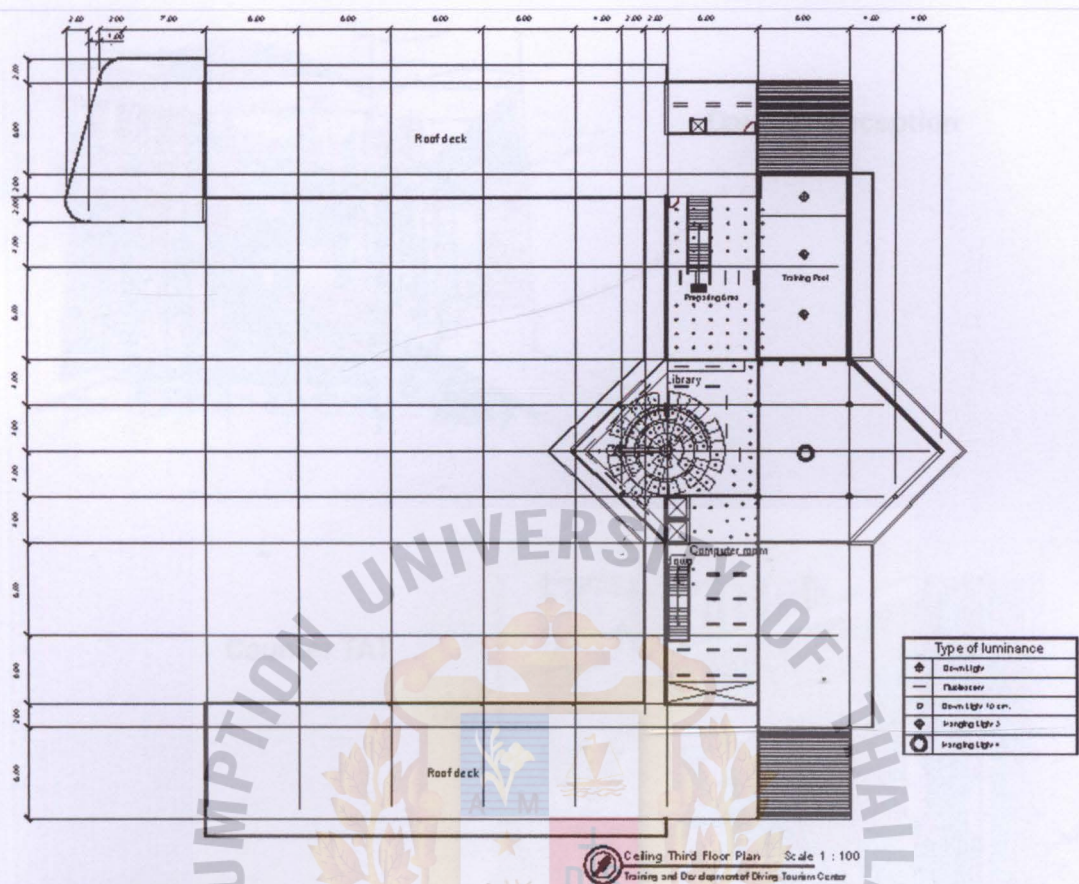
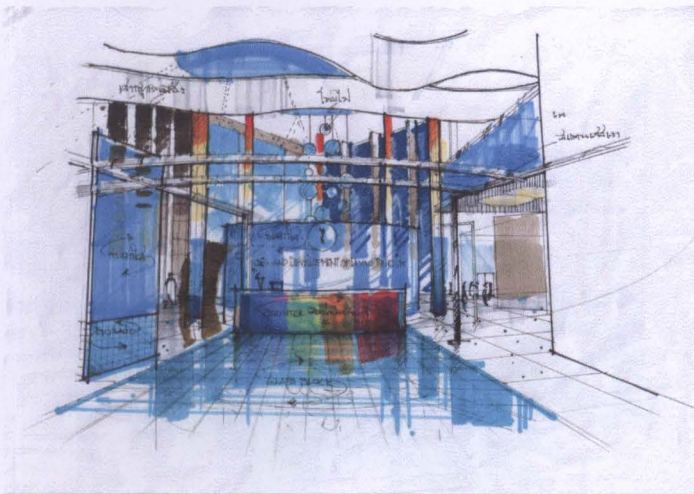


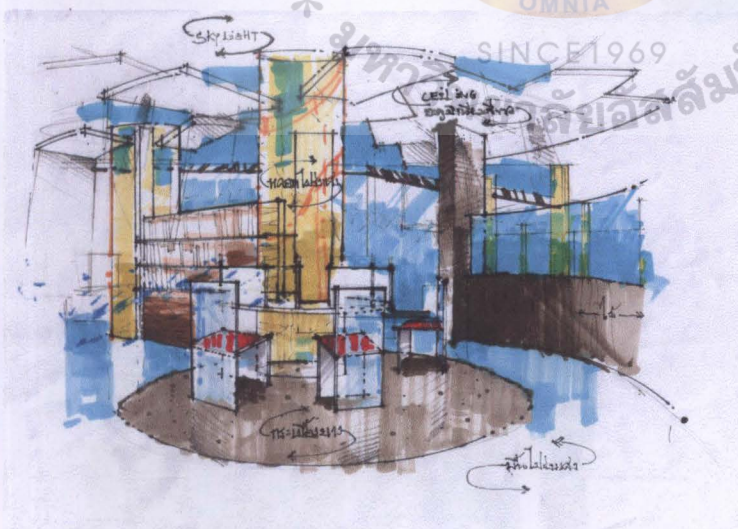
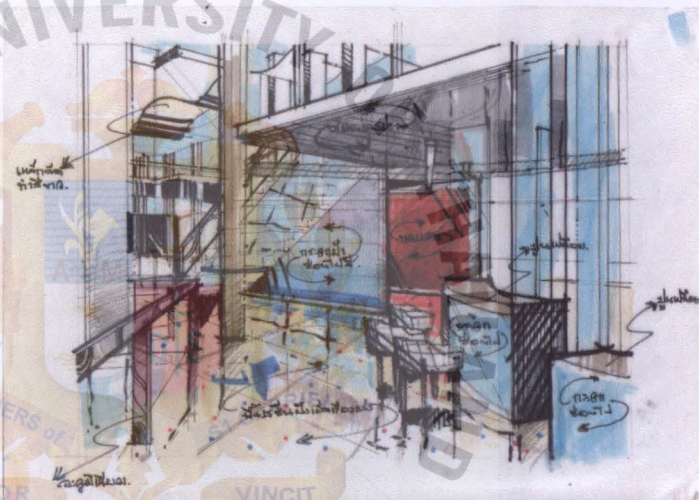
Figure 5.9 Ceiling third floor plan

Design development



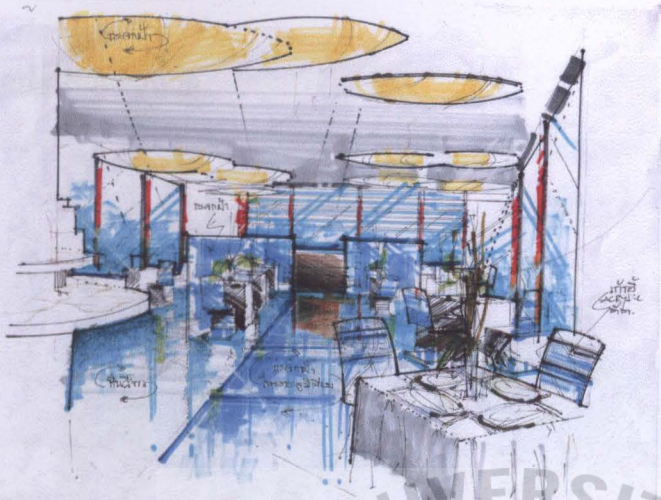
Counter Reception

Counter TAT



Library

Perspective

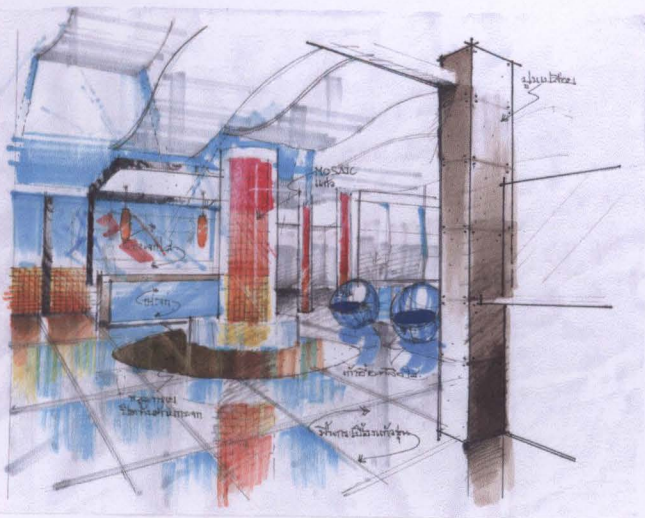


Restaurant

Meeting Area



มหาวิทยาลัยอัสสัมชัญ
SINCE 1969



Accommodation Counter

Perspective

Counter Reception

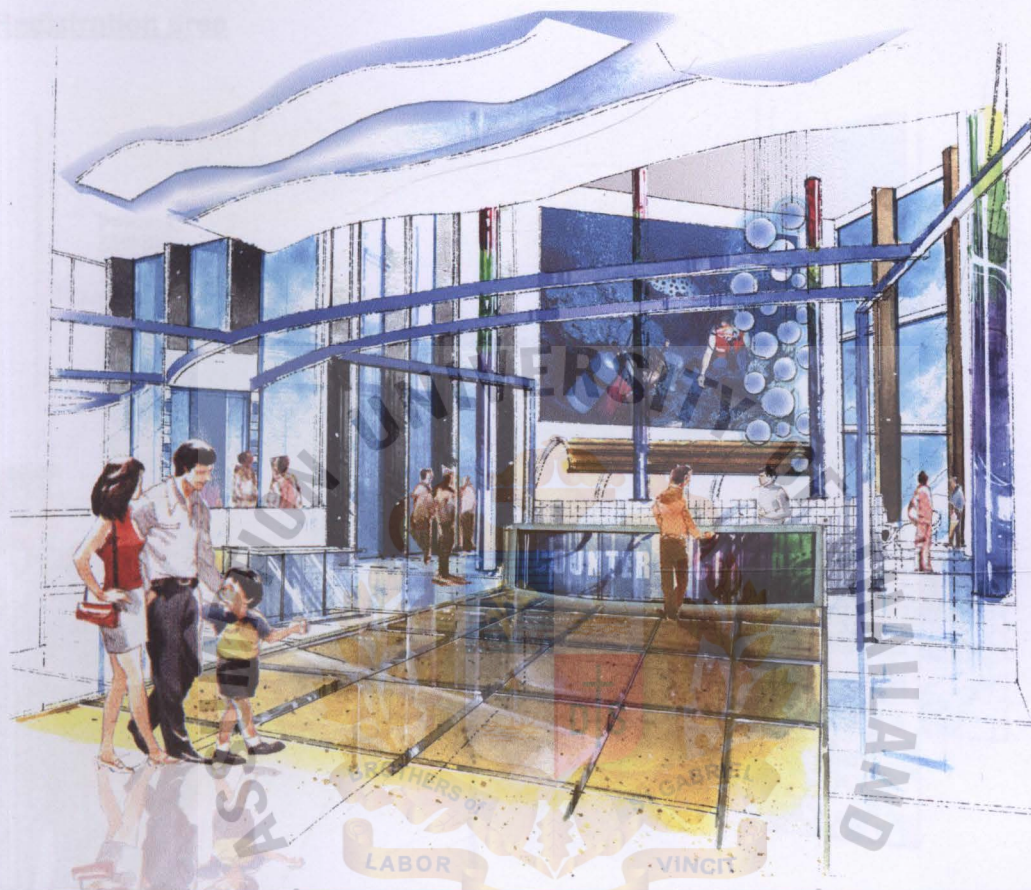


Figure 5.10 Counter Reception

Registration area

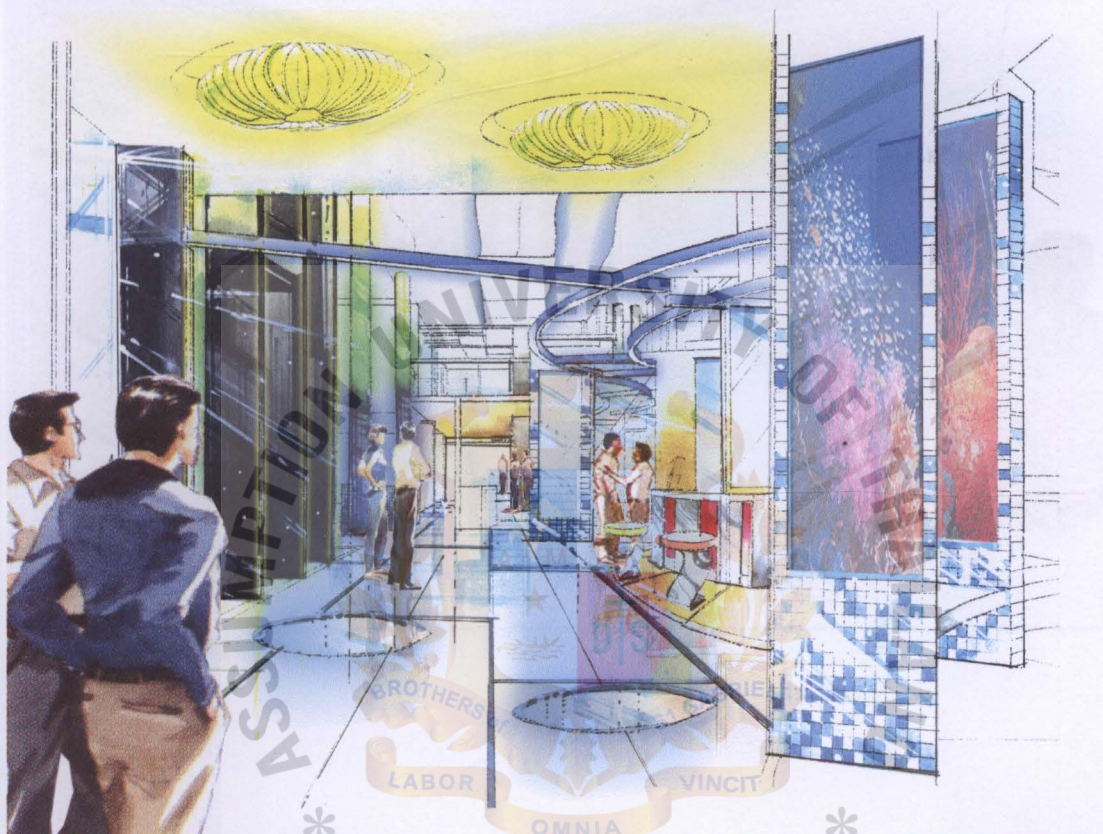


Figure 5.11 Registration area

SINCE 1969

มหาวิทยาลัยอัสสัมชัญ

Meeting area**Figure 5.12 Meeting area**

Circulation

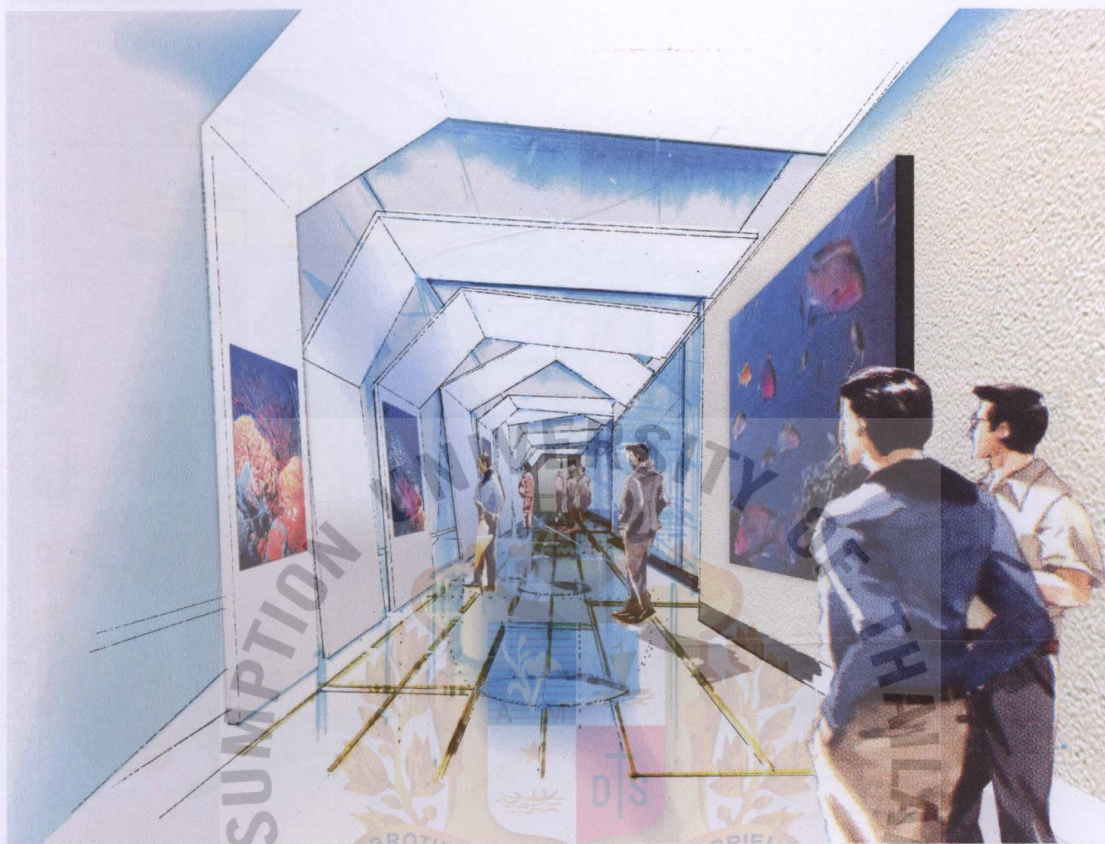


Figure 5.13 Circulation

* มหาวิทยาลัยอัสสัมชัญ *
SINCE 1969

Counter TAT



Figure 5.14 Counter TAT

* มหาวิทยาลัยอัสสัมชัญ *
SINCE 1969

Counter TAT

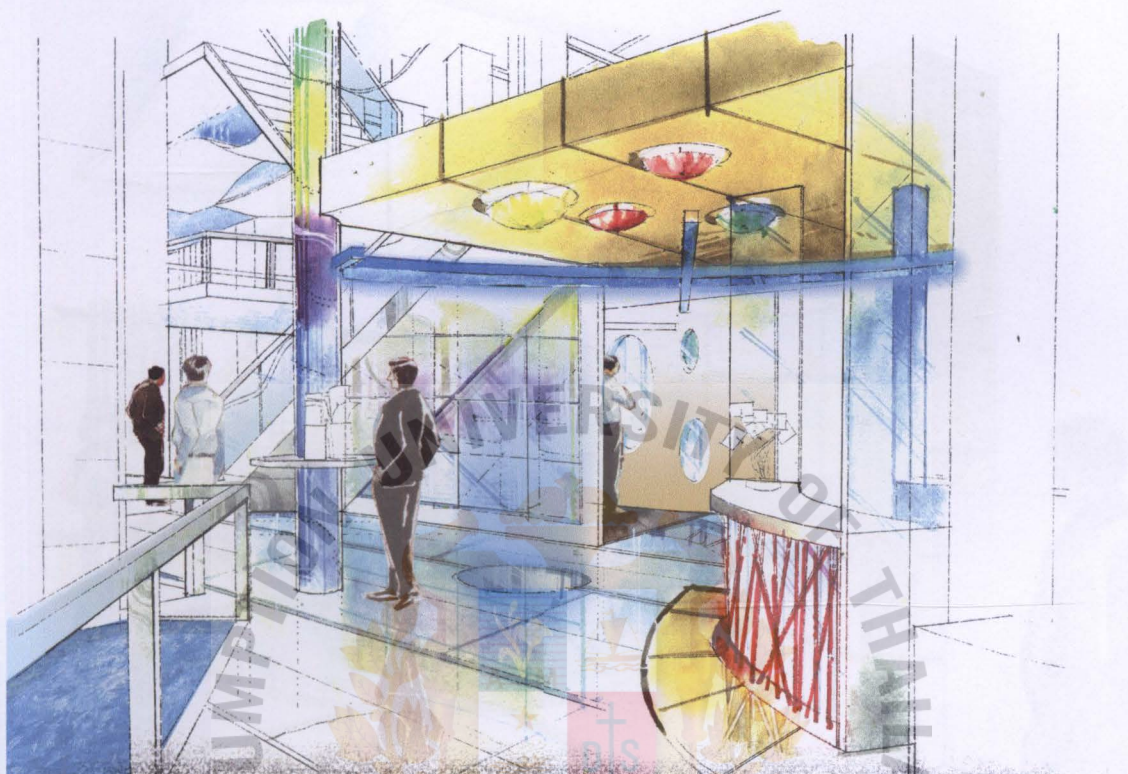


Figure 5.15 Counter TAT

Accommodation waiting area



Figure 5.16 Accommodation waiting area

* มหาวิทยาลัยอัสสัมชัญ *
SINCE 1969
BROTHERS ST. GABRIEL
LABOR OMNIA VINCIT

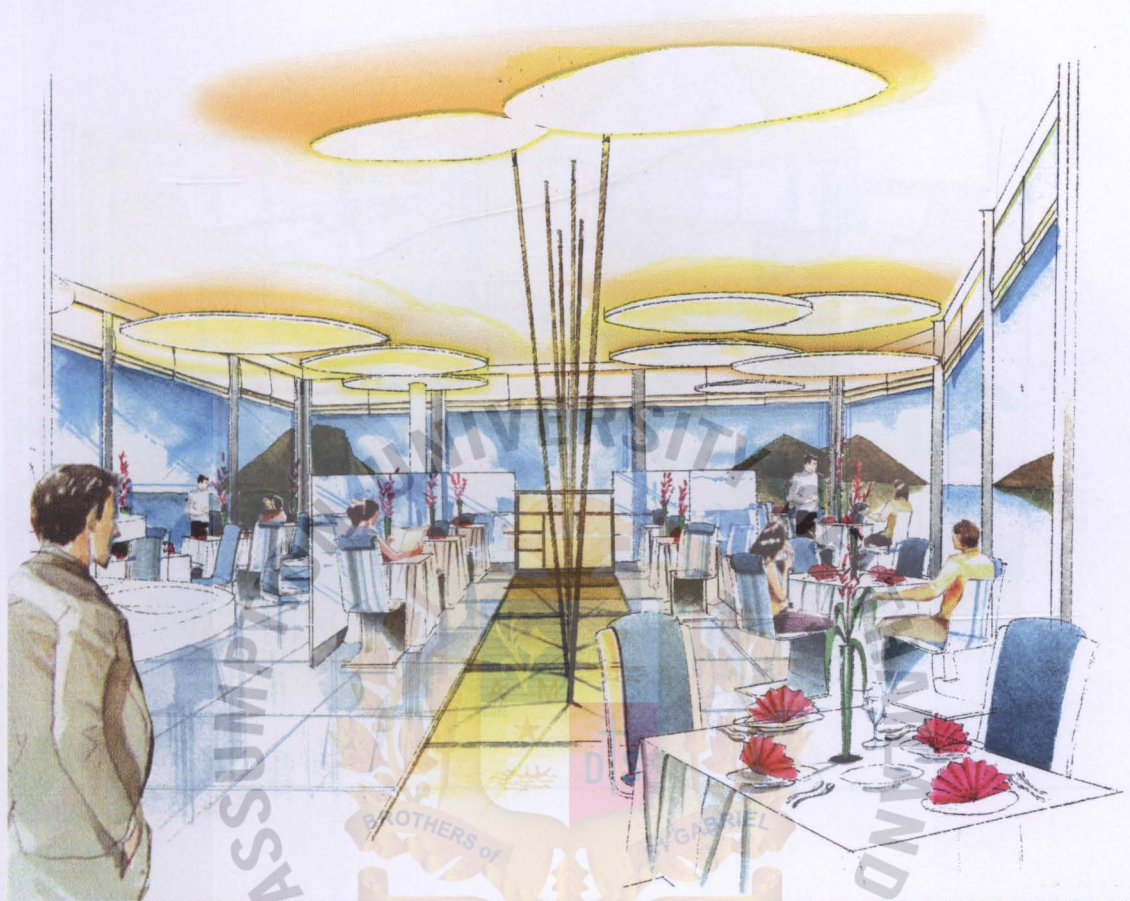
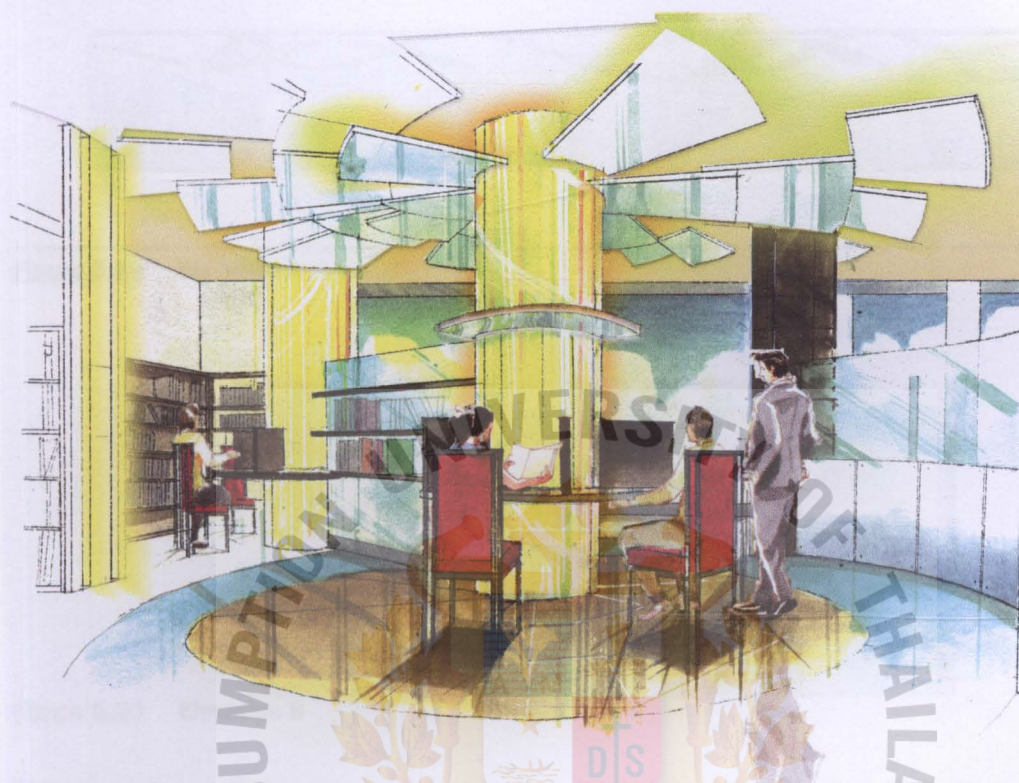
Restaurant

Figure 5.17 Restaurant

* มหาวิทยาลัยอัสสัมชัญ *
SINCE 1969

Library**Figure 5.18** Library

Section & Elevation



Figure 5.19 Elevation A



Figure 5.20 Elevation B



Figure 5.21 Elevation C

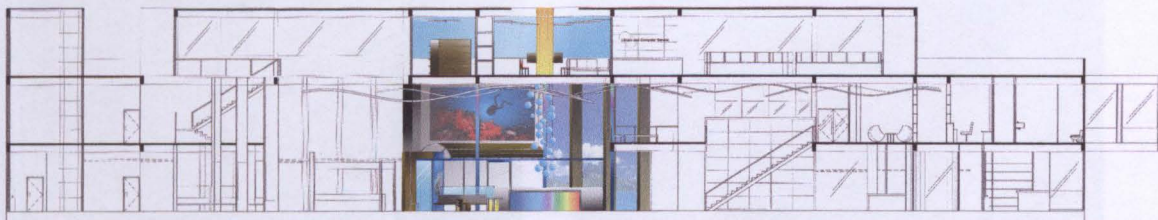
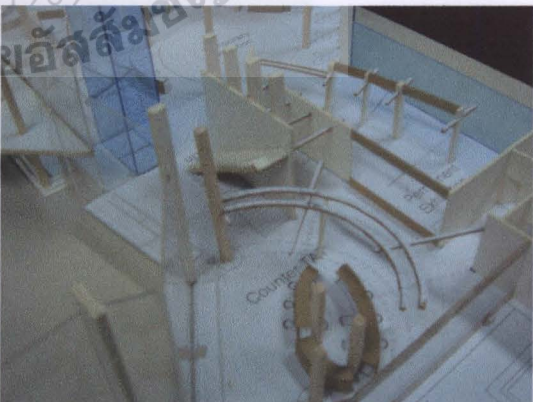
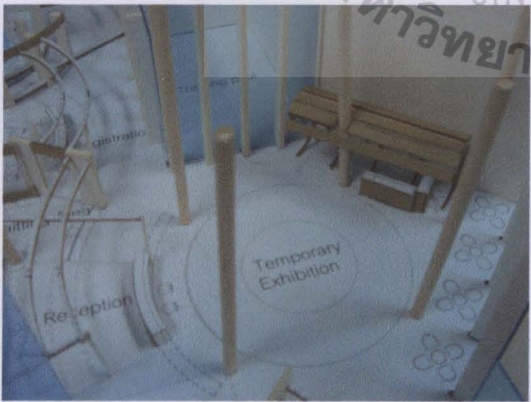
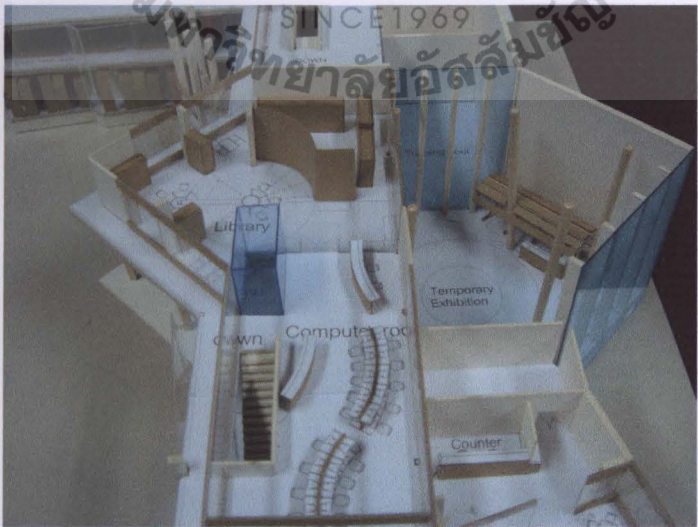
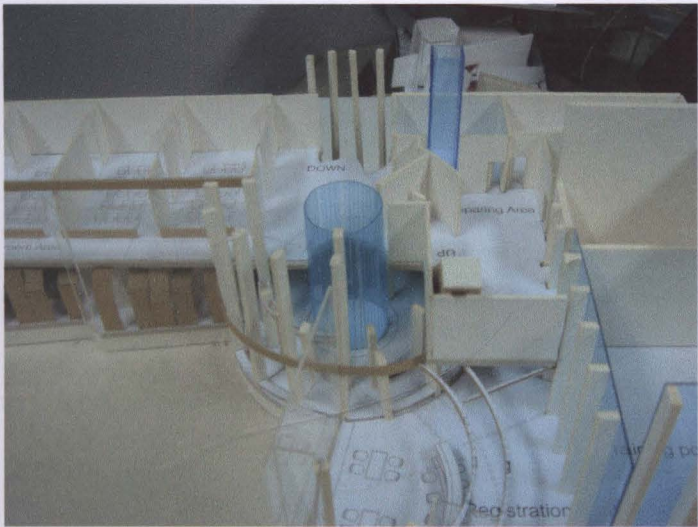


Figure 5.22 Section

Space Model





Bibliography

- Patricia Tutt and David adler, New Metric Handbook Planning and Design Data (Reprinted 1995), Hartnolls Ltd, Bodmin, Cornwall.
- Lam, William M.C., Perception and Lighting. (1998) Formgivers for Architecture (Edited by Christopher Hughripman)
- Lawson, Fred . Exhibition congress Architecture & Design(2001) Architecture Press, An imprint of Butterworth-Heineman

Book ~ Scuba grove Asia pacific)
(Book ~ Dive & Travel)

<http://www.gotomanager.com>
<http://www.businesssthai.com>
<http://www.naui.com>
<http://www.padi.com>
<http://www.ssiusa.com>



