

CHAPTER 2

Project Reviews

2.1 General Approach of The Project

2.1.1 General Description

Frozen

²⁾CP Mallet (:1993) explain frozen here means a process of making a raw fresh food material or food material to be freeze inside the freezer in order to make the food long lasting. Frozen food industry is a sector of the 'fast moving consumer goods'. Frozen food is a well developed technology for international trading which is need a longer shipping and longer lifespan of the food's fresh.

However ³⁾P.O.Persson and G.Londahl in CP Mallet (:1993) wrote the history of frozen system start in 1755 when a Scottish professor, William Cullen made the first apparatus to produce a small quantity of ice without using natural cold. Over the next hundred years the first refrigeration machine were developed by several inventors and introduced to large scale in 1870s. In 1931, fish and butter were become he main products that were frozen, and all were handled as bulk commodities.

2)1993,*Frozen Food Technology*,Blackie Academic&Profesional,page 20-21

3)1993,*Frozen Food Technology*,Blackie Academic&Profesional,page 20

The P.O.Persson and G.Londahl also explain that freezing process itself has three stages of temperature they are :

- The Pre-freezing Stage

The pre-freezing stage is the time period that elapse between the moment at which a product with a high temperature is subjected to a freezing process and the moment at which the water starts to crystalise.

- The Freezing Stage

The freezing stage is the period during which temperature at the considered location is almost constant because the heat being extracted is causing the main part of the water to change phase into ice.

- The Reduction to Storage Temperature

The reduction to storage temperature is defined as the period during which the temperature is reduce from the temperature at which most of the freeze-able water has been converted to ice to the intended final temperature (time when the storage temperature is reached any part of the product including the thermal centre).

Due to all statement above, a frozen factory can be stated as a 'fast moving customer goods' by freeze it.

Frog

According to interview with Mrs Titien Hidayat, the head of PT Sekar Bumi TBK, frog is one of natural resources from Indonesia that its leg is being exported to some European and Asian countries as raw frog legs or meat. Frog legs also being sell

raw in local market and famous for its local culinary called Swikee. There are several frog that being exported nowadays, these frogs actually is the same species and same physiology but their living habitat make them have different skin and biological name (especially for *kodok sawah* and *kodok rawa*) the picture 2.1 below is showing kodok sawah or rana cancrivera which is Indonesian's local frogs and become one of most exported frog legs. There are some frogs which legs is being exported :



- *kodok sawah* (rana cancrivera)
- *kodok rawa*
- *kodok hijau* (rana macrodon)
- *kodok totol* (limnocetes macrodon)

Fig 2.1. Rana Cancriversa
(Source :http://id.wikipedia.org/wiki/Kodok_sawah)

Factory

A **factory** (previously **manufactory**) or **manufacturing plant** is an industrial building, or more commonly a complex having several buildings, where workers manufacture goods or operate machines processing one product into another. Most modern factories have large warehouses or warehouse-like facilities that contain heavy equipment used for assembly line production. Typically, factories gather and concentrate resources :laborers, capital and plant.⁴

The factory also has specifications that based on the product that they manufactured and the government's law. Indonesia also has a classification of factory based on *Surat Keputusan Menteri Perindustrian Indonesia No 19/M/I/1986*, they are :

4) Source : en.wikipedia.org/wiki/Factory

- Basic Chemist Manufactory

Example : Cement factory, pharmacy factory, paper factory, etc

- Machine and Metal Manufactory

Example : aeroplane factory, motorcycle factory, etc

- Small Manufactory (more like home industry)

Example : bread factory, snack factory, etc

- Another Manufactory

Example : garment factory, food and beverage factory, etc

Based on the classification that Indonesia's Government has made, Frog Factory was included into Another Manufactory and a part of industrial due to its work as frozen food factory but sell the meat and frog legs as material food and raw food.

Inspite of those classification, recently many international factories have added side function of their factories which is to accept guests and held a recreational purpose. Many Japan manufactured factory have develop that kind of style such as Ajinomoto factory, Meiji Factory, etc. Indonesia's factory such as Sido Muncul also develop side function like those factories. Below are the difference of the pure manufactured factory and recreational factory that shown in table 1 below (manufactured and recreation factory) :

Table 1. Difference of Pure Manufactured and Recreational Factory

Pure manufactured Factory	Recreational Factory
Focusing only on manufacturing products	Manufacturing products will be its main

activities but recreation will be the side activities					
All space are private area	There is difference between private and public area		Public was not allowed to enter the factory	Public was allowed to enter the factory by appointment	
No public building or space	There is space or building to welcome the public, some of them even made special space such as D'Ummami in Ajinomoto Factory	There is boundaries between private and public area (in some process building to let the publics sees the process but not harm the process)	All building system secured and spatial zoning focus on profitable manufactured only.	Promotional always outside the factory.	Recreational system and public space inside the factory can be part of promotional aspect.

(Source : private doc)

Based on International Code of Practice – General Principle of Food Hygiene / HACCP by WHO (for the specific review of HACCP, see appendix) , there are several vectors which a food manufactured factory have to concern and make a good care of them which are :

- Waste

Waste are disposal which are can be hard material / contaminant or in liquid form. Waste itself is have to be care before being thrown to public garbage disposal and city sewerage or being used again. There are some treatment for industry which is often called "Industrial Sewerage Treatment Plan"

- Hygiene

Hygiene is the clean and clear system in manufacturing products. Hygiene itself is very concern in all food industry and become most ultimate criteria because the hygiene of manufacturing food itself will set the quality of the products itself. The potential effects of primary production activities on the safety and sustainability of food should be considered. In particular, this includes identifying any specific points in such activities where a high probability of contamination may exist and taking specific measures to minimize the probability.

- Healthy

Healthy means the affect of the building system to the users inside. It means that the layout, design, and mechanism of the building use can affect to the users health. A healthy building can keep the users healthy and free itself from contaminants and such patogen bacteria.

2.1.2 Backgrounds, Development, and Trend

Backgrounds

Mrs Titien Hidayat, the head of PT. Sekar Bumi, TBK also explain the background of Frog and frozen food development in Indonesia that Indonesia has famous for its natural resources and frogs is one among those resources. Those frog legs have big demand in several European countries such as France, Belgium, etc. Big profit is become the ultimate reason for several people to built the new Frozen Frog Factory lately.

Semarang city is a capital city of Central Java while Central Java is also provide the frogs, but there's no good enough Frozen Frog Factory that is fit enough to enter export market.

Development

The development of Frozen Frog Factory has grown to make a building complex that suit for process and warehousing some equipment and tools. Nowadays, the frozen frog factory has develop more luxurious building than just a cubical factory in order to make sure of the factory looks luxurious and the building can persuade the buyer to recognize the factory is high class, trustable, and guaranteed.

The development also come from the function of the factory, many factory has added side function which is to make an open recreation to public (by appointment). Several international factories have develop that kind of style which is made factories no longer pure production or manufacture products.

Trend

The factory recently have built in luxury style, especially in international trading factory which is need prestige and make the factory as good as it can to attract the buyer in order to put their trust in making trading contract with the factory.

Beside of luxury building, the global warming also become an issue to make a new style of factory which is energy efficient in order to make this factory profitable and and low energy. That's why the Frozen Frog Factory need to be developed as well.

2.1.3 Objectives and Targets

Objectives

The objectives of this Frozen Frog Factory is to develop a new style of Frog Factory which is have a cultivation research, processing area, warehouse, administration area, etc as main part of factory's daily activities but also have side part for another function which is a hall to gather and spatial cart road to make study tour for public and also energy efficient as a factory to response the global warming lately. Hopefully, this kind of factory will not only profitable factory but also become friendly factory.

Targets

- Frog Buyers (from export and local market)

By this project, the first intention will be to attract the buyers that always make a survey to factory to put believe in this factory's bonafide and become loyal buyer.

- Social Society

By this project, the social society can look at the process of the packaging and make sure that frog quality is safe and clean enough for them and others to eat.

- Architecture Students

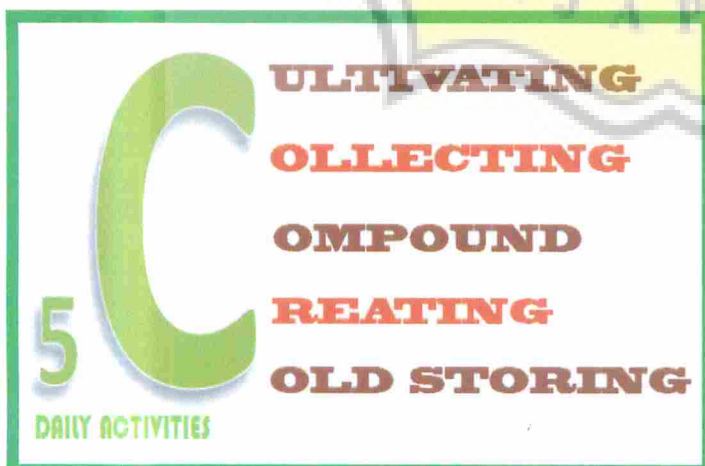
By this project, can be a good sample as a good and efficient factory, also can help architecture student to make a good factory.

2.2 Specific Reviews of The Project

2.2.1 Terminology of Frozen Frog Factory

The Frozen Frog Factory in this project will be Frozen Frog Factory which is working to manufacture frozen raw frog legs and frozen frogs as the main income, but also open study recreation for public. Therefore the specific explanation for the activities that being held in this factory :

Main Activity



The Frozen Frog Factory in this project here means a complex of buildings which is work as developer of frogs as its daily activities. The daily activities are known as 5C as told in picture 2.2, they are :

Fig 2.2 5C Frozen Frog Factory's Daily Activities
(Source : Private Doc)

- **Cultivating** here means a process to doing cultivation research and small laboratory for the frogs as a part of future concept that need to think against the lack of rice field which means the lack of frog's habitat.
- **Collecting** here means a process to collect frog legs from all frog legs supplier that sell their frogs into the factory.
- **Compound** here means to combine all the collecting and cultivating frogs, cleaning, and categorizing it into the raw material for frozen frog legs or frozen frog.
- **Creating** here means making something new with the frog legs to making a new goods and new style of frog nugget which is called frozen frog.
- **Cold Storing** here means to save whether the frozen frog or raw frog leg into the cold storage before being ship into abroad buyer and local market.

Side Activities (Recreation)

Beside of the 5C Daily Activities above, the Frozen Frog Factory also have a side activities which is open a study recreation for public. Therefore, the recreation's guests will be accepted in special building which is made to meet and greet with public people.

The recreation will take vehicle cart to pass some of the place and in several place, the guests will permitted to look closer by themselves. Below are the figure 2.3 that explain the route of recreation and the explanation :

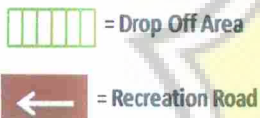
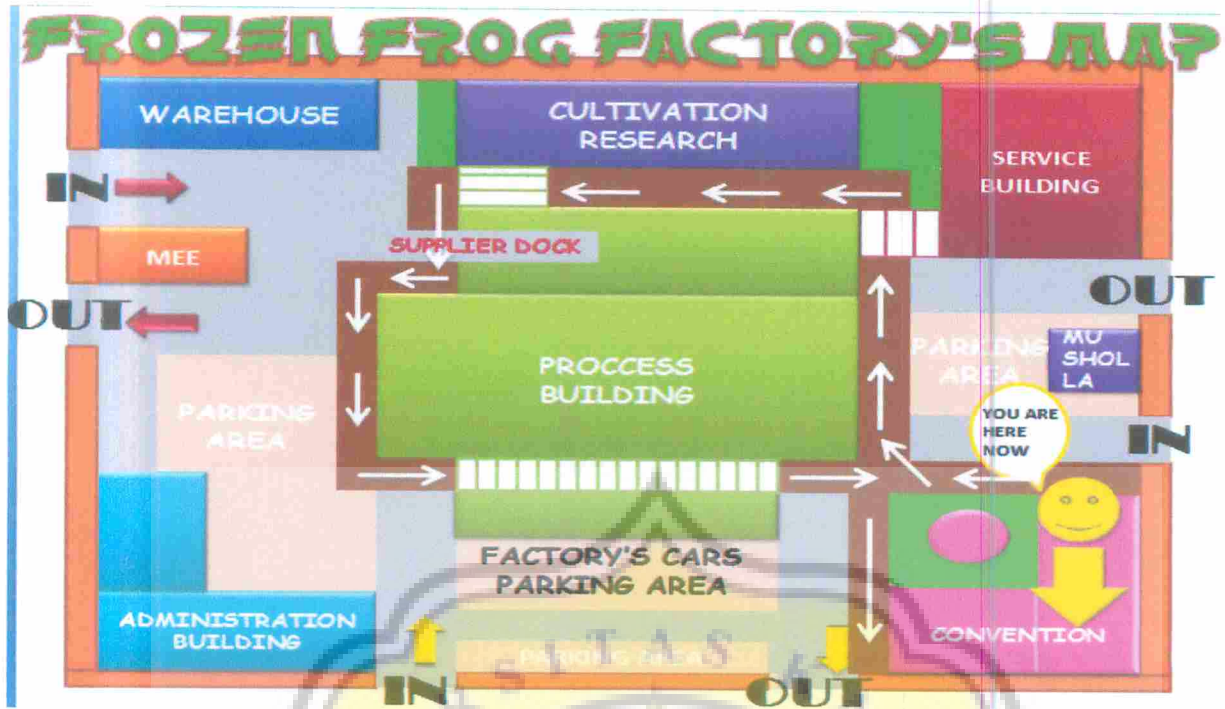


Fig 2.3 5C Frozen Frog Factory's Recreation Map
(Source : Private Doc)

- The vehicle cart road show in brown line. The cart start from the convention building where the guests are gathering and walk to cultivation research as the first destination.
- The guests will be allowed to walk inside cultivation research and look closer at develop cultivation system and its laboratory by 10 persons each turn given 10 minutes each.
- After finished in the tour in cultivation research, the cart will flow across and enter the process building. Here the guest will be allowed to see from the

cart via aisle road where the glass window will be the partition between private and public zone.

- The guess will be allowed to get off from the cart and look closer in packing process to the truck.
- After look at packing process the cart will return into the convention to get some explanation about the frogs, factory, and promotional products exhibition from the factory.

Frozen Frog Factory's Concern

Frozen Frog Factory itself is another manufactory which concern of raw frozen meat and frozen food. In a food factory, the factory have to make sure that people as consumer have the right to expect the food they eat to be safe and suitable for consumption.

Based on International Code of Practice – General Principle of Food Hygiene / HACCP by WHO (*for the specific review of HACCP, see appendix*) , there are specific criteria several vectors which a food manufactured factory have to concern and fulfill to make an ideal factory building which are :

- Waste – Compound and organize waste management of Frozen Fog factory which still can be sold and making a treatment especially for the liquid waste to be reuse again
- Hygiene – Control the food from all contaminants and protect the resources from faecal by making hygiene storage, keep all the building equipment and building skin to be washable and disinfected

- Healthy – Make sure the natural daylight can be used in some rooms which are allowed to put the light in, keep the temperature and resist humidity to kill bacteria in room with artificial lighting.

2.2.2 Activity User

Based on observation studies, a good factory is need a mass of laborer and workers with a really good operation management which is have a structural organisation and the top head is led by a chief. The user of Frozen Frog Factory for this project itself also mass of people which is manage, working, and doing all the daily activities. This figure 2.4 below will explain the organisation structure of Frozen Frog Factory's staff:

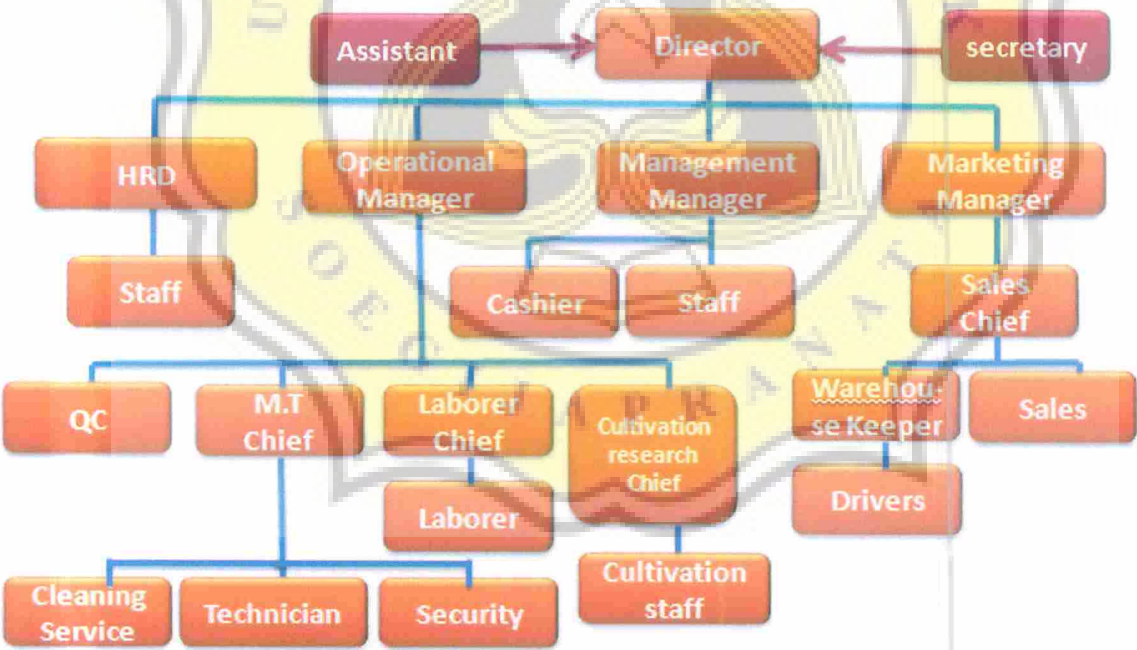


Fig 2.4 Organisation Structure
(Source : Private Doc)

By figure above, there is a classification of building user which is organized the building user with their main activities and main facilities. The classification is based on their own activities, they are explained as table 2 below :

Table 2. Activity of Building User

No	Building User	Main Facilities	Main activity
1.	Main Staff (from Director to staff and cashier)	Administration building (meeting room, guest room, working room, etc)	Managing the factory's activities, welcoming the guest, meeting, etc
2.	Laborer	Process Building (cold storage, resting room, eating room, locker room, etc)	Cutting the frogs, operating machine, measure the frogs, cleaning the process room, storing the frogs, take a break, etc
3.	Buyer	Convention Building (Guest room, travelator area, etc)	Inspecting, bargaining,etc
4.	Guests	Convention Building (Guest room, convenience hall, travelator area, etc)	Inspecting, take a trip,etc
5.	Government's inspector	Convention Building (Guest room, travelator area, etc)	Inspecting, bargaining,etc

6.	Security	Security post, CCTV room	Make secure of the factory, checking the CCTV, checking the laborer's presence, etc
7.	Warehouse Keeper	Conv Building Warehouse Area (keeping room, stocking room,etc)	Keep the warehouse
8.	Cleaning Service	Toilet and lavatory, janitor room, laundry room,dryer room, pantry, etc	Cleaning room
9.	Cultivation research chief and staff	Cultivation Room, Cutting room, Rest area	Keeping the Frogs, observe and making research, rest
10.	Drivers	Parking area, garage, rest room	Park the factory's truck and cars
11.	Technician	Panel room and genset room	Repair the machine, keep the panel, etc

(Source : private doc)

2.2.3 Specification and Design Requirement :

There are requirement which is being standart of international food hygiene. This standart is International Code of Practice – General Principle of Food Hygiene / HACCP by WHO (*for the specific review of HACCP, see appendix*). Below are the regulation especially concern about factory standart environment, building, and rooms :

Section IV.1 – Estabilishment : Design and Facilities

Estabilshment in location requirement :

- Located away from environmentally poluted areas and industrial activities which pose serious threat of contaminating food.
- Free from flooding unless sufficient safe guard provided.
- Located areas are not prone to infestations of pest.
- Located area can removed waste, either solid or liquid can be removed effectively.

Section IV.2 – Premises and Rooms

Design and Layout

- The internal design shoud permit good food hygiene practices, including protection against cross-contamination between and during operation by food stuff

Internal Structure and Fittings

- Structures between food establishment should be soundly built of durable materials and be easy to maintain, clean and where appropriate, able to be disinfected.
- The surface walls, partitions, and floors should be made of impervious materials with no toxic effect in use.
- Walls and partitions should have a smooth surface up to a height appropriate to the operation
- Floors should be constructed to allow adequate drainage and cleaning.
- Ceiling and overhead textures should be constructed and finished to minimize the build up of dirt and condensation, and the shedding of particles.
- Windows should be easy to clean, be constructed to minimize the build up of dirt and condensation, be fitted with removable and cleanable insect-proof screens. Where necessary, windows should be fixed.
- Doors should have smooth, non absorbent surfaces, and be easy to clean, and where necessary disinfect.
- Working surfaces that come into direct contact with the food should be in sound condition, durable and easy to clean, maintain and disinfect. Made from smooth, non absorbent surfaces, and be easy to clean, and inert to food, to detergents and disinfectants under normal operating conditions.

Section IV.3 – Equipment

- Equipment of the factory have to be located where it can easily cleaned, maintained, and disinfectant. Equipment should using non toxic material.

Section IV.4 – Facilities

- Water supply – between the usage water for manufacured food and utility have to be splitted.
- Drainage & Waste disposal - Adequate drainage and waste disposal system and facilities should be provided.
- Cleaning – Adequate facilities, suitable designated, should be provide for cleaning food, utensils and equipment.
- Personnel hygiene facilities & toilets - Hygienically washing and drying hands, including water basin and suitably temperature controlled water. Lavatory hygienic design and adequate changing facilities for personnel.
- Temperature control - rooms have to be able to accept temperature of process which is heating, cooking, cooling, freezing (extreme temperature).
- Air quality and Ventilation – minimize air borne contamination of food, areosol and condensation droplets. Control humidity, ambient temperatures, and odours that might affect the suitability of food.
- Lighting – Using artificial lighting especially working lighting which is necessary for process is needed.
- Storage - Food storage faciities have to be constructed.

Those criteria above have to be exist and construct in this factory in order to fulfill the standard for export factory. Beside of those regulations, the factory itself have some required specification which is include of aspect belows :

Architectural

- This building have enough space for each activities that will be held as factory daily activities with some good separation space in order to manage the building based on their activities consecutively. So there will be no cross circulation or wasting energy to reach one another building. - **layout** -
- Inside of the building is maximally design for the functional side of the building. The design and the organisation is made based on the function of building. – **function** –
- This building facade need to be special, which mean the facade not only look for functional side but also the asthetic needs. This have to look for the aesthetic in order to add some value for the factory as packaging and give a “building persuasion” for its luxuriness guaranteed. –**facade**–
- Cultural

In earlier century, frog just become a minority's dishes and a part of Chinese Dishes called swikee (“swi”/shui : water, “kee”/ji: chicken). Therefore, swikee itself is hokyan language and consumed by chinese people. As time flows, the local people also enjoyed them. Many swikee restaurant has made result that

swikee has been Indonesian dishes too and become popular in several city and town such as Semarang, Purwodadi, Patarukan, Surabaya, and Jakarta.

- Social

This building is built also for social function (educational trip inside the factory) so the building must be think also as social place and develop a side which will be designed as social places.

- Economy

This building is have to be designed with economic value, that means in every part of the building have to be usefull and not wasting any space.

- Technology

The technology of the building have to be organized as well as well as the technology because a factory can't be divided from technology that most of all it always fully help a factory activities.

Building

- This building need to do something with its main waste that is water, so treatment is needed in order to make a green concept by treatment the waste and reuse again.
- Building layout and design orientation is need to be concern in order to make an energy efficient building which is more efficient especially in air conditioning.

- Structure of this building will be wide span structure with metal and have to be shown. This is not only to make a compatible fasade but also a sign to show an identity of a factory.

Environment

- The waste disposal must be treated so it would not contaminate the surroundings and reuse again (as a part of green design for better earth).
- Trees and plants is the one effort to protect the site from landslide and to absorb rain water. Beside of using the rain water to do some activities, planting and keeping trees is a must to be plant also for give little protection the heat.

2.2.4 City Determination

This project is planned in Semarang city, as a capital city of Central Java Province. This city is located on the north side of Java Island , at 6°50' - 7°10' S and 109°35' - 110°50' E.

There are boundaries of Semarang city as stated below:

North : Java Sea
East : Regency of Demak
South : Regency of Semarang
West : Regency of Kendal



Fig 2.5. District Map
(Source : www.google.com)

City Administration

Administratively, Semarang City is comprised into 16 Sub-Districts (as shown in fig 10) and 177 Villages. The whole area of Semarang is 373.30 km², which can be divided into 10 District.

- | | |
|-------------|---|
| District 1 | : Central Semarang (1), East Semarang (2), and South Semarang (3) |
| District 2 | : Candisari (4) and Gajahmungkur (5) |
| District 3 | : West Semarang (6) and North Semarang (7) |
| District 4 | : Genuk (8) |
| District 5 | : Pedurungan (9) and Gayamsari (10) |
| District 6 | : Tembalang (11) |
| District 7 | : Banyumanik (12) |
| District 8 | : Gunung Pati (13) |
| District 9 | : Mijen (14) |
| District 10 | : Ngaliyan (15) and Tugu (16) |

It is the district table 3 below is about administration area and function planning below :

Table 3 District in Semarang City

District	Administration Area	Function Planning
I	East Semarang, Central Semarang, South Semarang	Downtown
II	Candisari, Gajahmungkur	Settlement
III	North Semarang, West Semarang	Transportation, Industrial, Recreative city
IV	Genuk	Industrial, Settlement
V	Pedurungan, Gayamsari	Small Industrial Area, New Settlement, urban
VI	Tembalang	Settlement, Education
VII	Banyumanik	Settlement Area
VIII	Gunungpati	Buffer Zone
IX	Mijen	Buffer Zone
X	Tugu, Ngaliyan	Industrial and Conservation Area

(Source : private doc)

Industrial Area

There are several location of industrial area in Semarang,they are :

- 1. Tambak Aji Industrial Area , located in BWK X

2. Gatot Subroto Industrial Area ,located in BWK X
3. Terboyo Industrial Area ,located in BWK IV
4. LIK / Genuk Industrial Area, located in BWK IV
5. Candi Industrial Area, located in BWK VII
6. Pedurungan Industrial Area (small industrial area), located in BWK III

Infrastructures Transportation

There are some transportation in Semarang City which categorized according to functions : Land Transportation, Sea Transportation, and Air Transportation.

1.Land transportation

Through the Pantura Road, Semarang is connected to other cities on the north coast of Java Island.

The Public Land Transportation in Semarang consist of : Trains, Buses, Mini-Buses, Taxis, pedicabs. The Individual Land Transportation there are cars and motorcycle in this City.

Semarang has three bus terminals and 1 sub-terminal. There are Terboyo Terminal which located at the north side, Mangkang bus Terminal is at the west side, and then Penggaron Terminal is at the east side. Then sub-terminal is at the south side of Semarang

Semarang has two train stations: Tawang Train Station, for business and executive class passenger trains, and Poncol Train Station for economic class passenger trains and cargo trains. These stations serves various destinations from Semarang to

other city such as Semarang-Jakarta, Semarang-Yogyakarta, Semarang-Surabaya, etc.

2. Sea transportation

There are some sea transportations in Semarang, The Tanjung Mas Port at the north coast of the city connects Semarang with other ports in Indonesia. It usually used to logistics are and other transportations.

3. Air Transportation

Semarang City has an airport which provide air transportation which called Ahmad Yani Airport. It connects Semarang with the other big cities in Indonesia and Singapore. Since 2004, Ahmad Yani airport has been graded a status to be an International Airport in Central Java. At the moment, Ahmad Yani Airport has a runway of 2.252 x 45 meters. The average number of passengers daily is between 1600-2000 people.

At Ahmad Yani Airport there are many flight companies, such as Garuda Indonesia, Lion Air, Batavia Air, Sriwijaya Air and the other Planes

2.2.5 Case Study and Observation Plan for Frozen Frog Factory

Before making a concept for Frozen Frog Factory, the observation to several place in order to learn the specific review (Case Study) which is will be support the factory activities is needed and a visit to similiar object with the project also important in order to make comparation which will result the better design than the existed one.

Case Study

There are several place that needs to be observe in order to find the specialities of that place which can be place and develop for Frozen Frog Factory. This Case Study survey is base to solve between the design or the case / problems that occurs in factory. This case study is different from the observation plan because case study is focusing on an issue of the case. As we can say that the case study isn't going to explain about whole of the building but just a main part with analysis. Below are table 4 that show several place that being observed as case study :

Table 4 Case Study Observation

Name of place	Location	Case To be observed
PT Caroen Pockpand,TBK's Shrimp Hatchery	Rembang	Hygiene and hatchery sterilization system
Bandeng Lumba-Lumba	Semarang	Nuggeting System

(Source : private doc)

1. PT Caroen Pockpand,TBK's Shrimp Hatchery

This Shrimp Hatchery is belong to PT Caroen Pockpand,TBK and was located in Rembang. This hatchery is securely private and only can be seen by private request to the PT Caroen Pockpand. This Hatchery's administration is work as daily work times (8.00 a.m to 4.00 pm) while the keeper is working for 24 hours with control system per- 4 hour each. This shrimp hatchery isn't seems like hatchery instead due to the close tight façade.

Therefore, the building part for the of sterile hatchery for the shrimp as explain below :

1. Shrimp hatchery system :

The hatchery system is made in private guard and equipped with ozone water filter system in order to combine the suitable water (mixing salty water / sea water and plain water). That can be the reason why a hatchery for shrimp have to be built near to the sea. Therefore, the pool have to build covered from the direct sunlight and was divide into 3 different pool in order to categorized the age of the shrimp also to avoid shrimp's stress temper. This figure 2.6 that show diagram below are showing the step and category of the pool instead :



Fig 2.6 Step of Shrimp Hatchery
(Source : Private Doc)

- Hatching Shrimp Pool

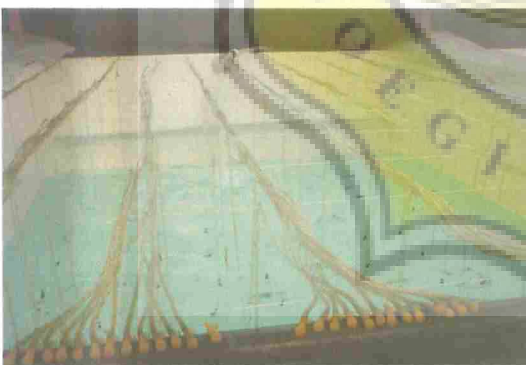


Fig 2.7 Hatching Shrimp Pool
(Source : Private Doc)

The Hatching Shrimp Pool (fig 2.7) is the place to hatch the shrimp's eggs. This pool is divided into different boxes with 1m x 1m modular each and equipped with oxgen pipe to boost the quality of pool water which is really need a lot of oxygen.

- Newborn Shrimp Pool



Fig 2.8 Newborn Shrimp Pool
(Source : Private Doc)

The newborn shrimp pool (fig 2.8) is secondary pool after the eggs is born. This pool is categorizing the newborn shrimp pool and moduled to 2m x 1m pool each.

This pool is covered with plastic to keep sterile the newborn shrimp.

- Baby Shrimp Pool / Benur



Fig 2.9 Baby Shrimp Pool
(Source : Private Doc)

This baby shrimp pool is to place the shrimp which aren't newborn anymore. This pool place outside

to adapted the shrimp with real temperature and humidity of the environment. This pool is moduled 3m x 1m and equipped with pipe which being holed to make surface of the water move.

Beside all of the private area, this hatchery also equipped with several facilities (fig 2.10) such as administration office, boarding house, bathroom, warehouse and packing area as seen below :



Warehouse building



Administration building



Keeper's Boarding House



Bathroom and Lavatory

Fig 2.10 Hatchery Facilities

(Source : Private Doc)

Potential of the Shrimp Hatchery :

- Really private and hygiene hatchery
- Complete room and good spatial organization

Constraint of the Shrimp Hatchery :

- There's no mate pool, the pool in this hatchery is already started from the hatch (it will produce more baby shrimp if there's mate pool)
- Lack capacity of warehouse

ANALYSIS FOR SHRIMP HATCHERY WITH CULTIVATION AREA IN FROZEN
FROG FACTORY

Table 5 Analysis Shrimp Hatchery and Cultivation Area

Shrimp Hatchery	Cultivation Area
The categorized pool based on the age of the animal	
Really concern of hygiene environment and circumstances	
Oxygen booster and the other hatching things is the same and really needed to make sure the water's condition is comfort enough for the animal	

(Source : private doc)

The table 5 above is explain the same condition between Shrimp Hatchery and Cultivation Area. That means that some of the system can be developed in cultivation area. Inspite of the system, the hygiene system of this building also can be developed inside the factory which is using the split level to wash boots and transital area to dry it as picture below :

To keep hygiene for the laborer is washing hands with soap and water but also using sanitizer and washing the boots with calcium hyphochlorite. The entrance area for in and out is made difference in order to keep the extra safety of hygiene. This hygiene sistem is affect to building design. Due to survey in PT Charoen Pockpand,TBK's Shrimp Hatchery in Rembang (case study for cultivation sanitation and factory hygiene) found that there are also several requirement for keep a hygiene of factory which is "Split level" (see fig 2.11).

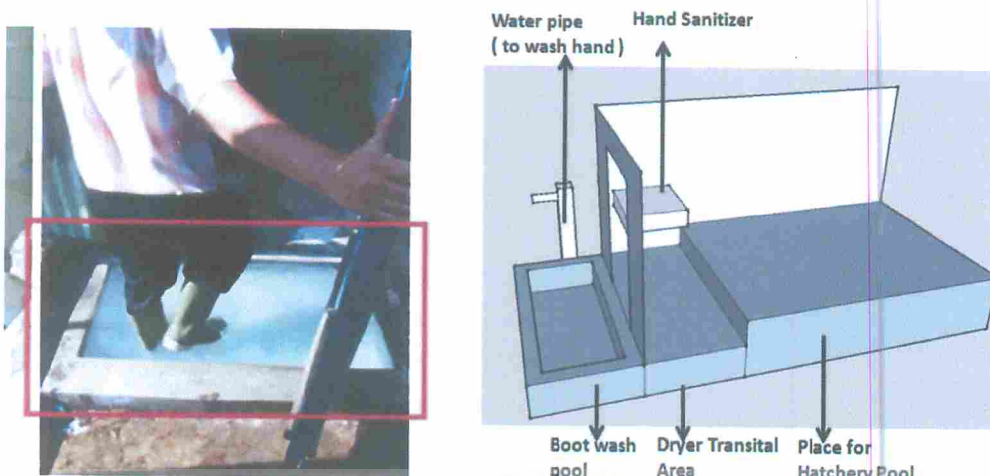


Fig 2.11 Hygiene System
(Source : Private Doc)

The Shrimp Hatchery's hygiene is only using one step of cleansing boots but place the split level in every room.

2. Bandeng Lumba – Lumba Factory – Semarang City

Bandeng Lumba-lumba is located at Kayu Mas Street Semarang and choosen for case study in order to help in making frog nugget which is haven't exist in nowadays. Bandeng Lumba-lumba is make product called otak bandeng which will be based recipe to make Frog Nugget.

Below are fig 2.12 that show the process to make Otak Bandeng :

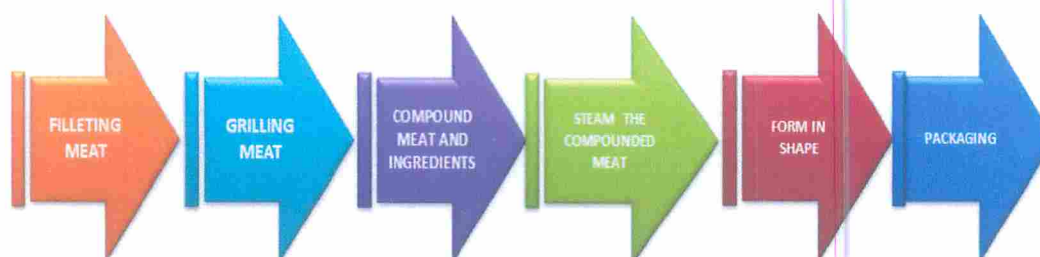


Fig 2.12 Step to Make Otak Bandeng
(Source : Private Doc)

The production room is actually based on one large room with spatial zoning to do all the process above. Not just processing room but this building is also have some facilities such as lavatory, laborers' bedrooms as picture below (fig 2.13).

Below are the spatial zoning and the spatial of the Bandeng Lumba-Lumba's Factory (fig 2.14)

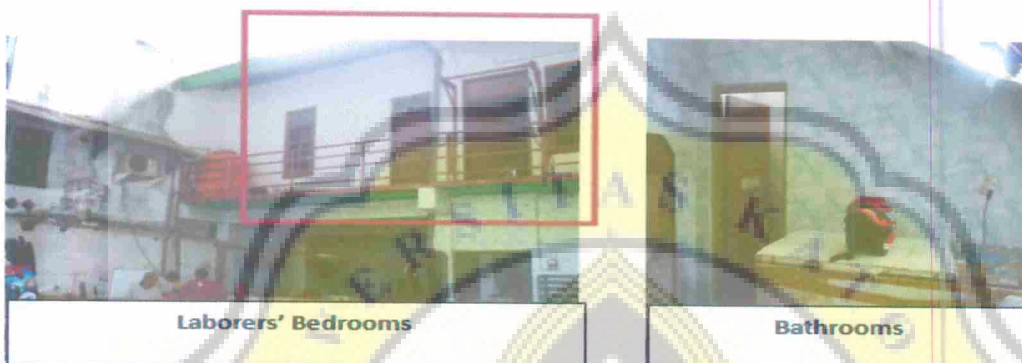


Fig 2.13 Facilities at Bandeng Lumba-Lumba Factory
(Source : Private Doc)

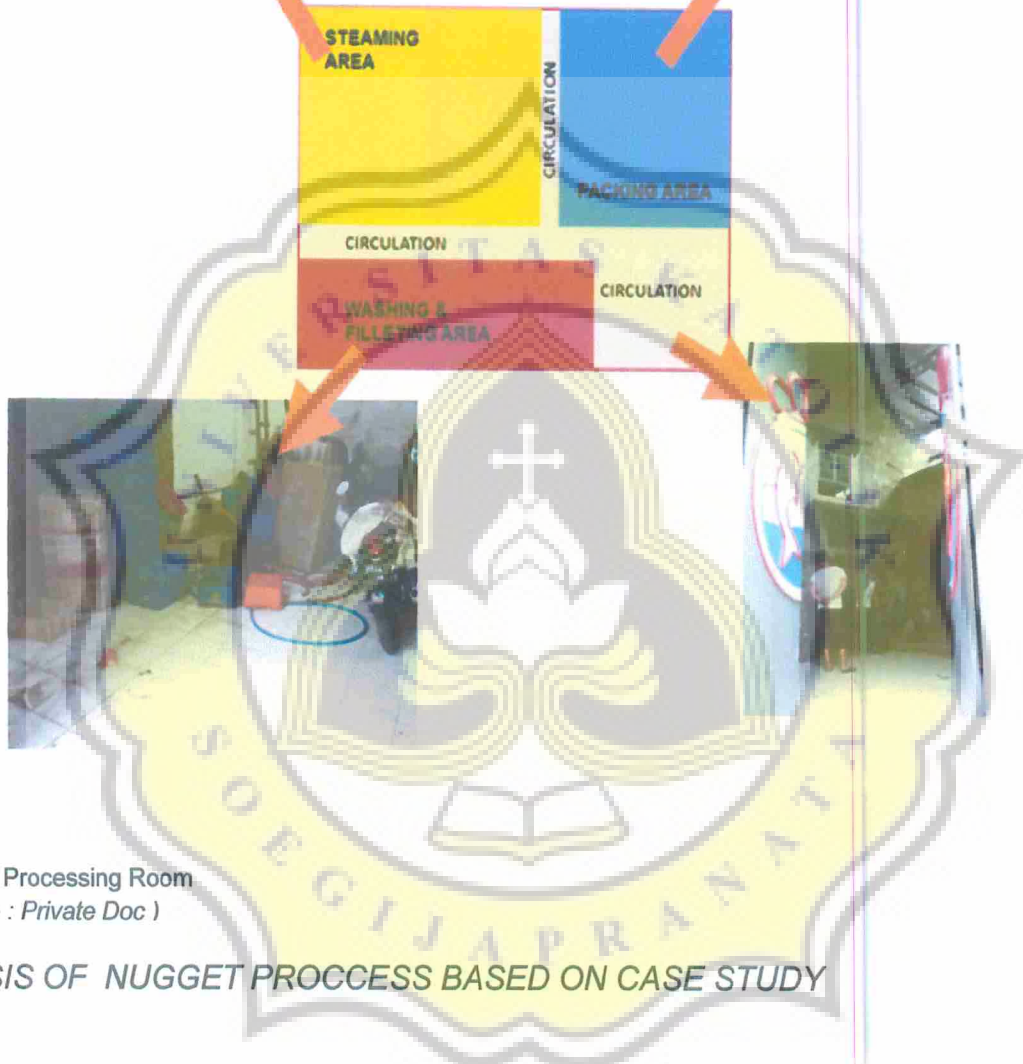


Fig 2.14 Processing Room
(Source : Private Doc)

ANALYSIS OF NUGGET PROCCESS BASED ON CASE STUDY

Due to this survey result, there will be conclusion about the develop of frog nugget which can follow the steps above :

- Filleting the frog meats then grill and compound with the ingredients and seasonings.
- Form in shape (square or circle) then steam it.

- Make a special package with vaccummed machine and store to cold storage.

Observation Plan

Name of place : PT Sekar Bumi TBK

Location : Jenggolo Street , Sidoarjo – East
Java

Division : Frozen Frog Legs Factory, Sekar
Katokichi, and Frozen Shrimp
Factory

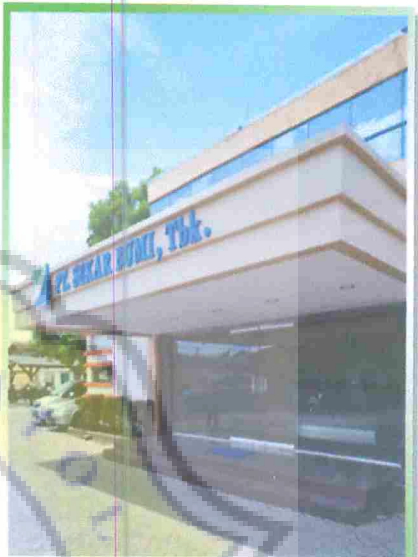


Fig 2.15 PT SekarBumi,TBK
(Source : private doc,2012)

History

PT Sekar Bumi TBK (fig 2.15)was located in Sidoarjo, East Java. This factory is an important assets for city. This Factory is located at Jenggolo Street 2 / 17. PT Sekarbumi was estabilished at 1960's by Mr Harry Soesilo (founder of Sekar Group) and started to export chilled fish and shrimp by using airplane to Singapore and Honkong. Due to technology, the factory has grow up and find a frozen technology to make sure their marketshare to Europe and make another trade by selling frog legs which is famous in some of European Countries such as France, Belgium, etc. And now, PT Sekar TBK has divide into 3 division which is frog division, shrimp division, and fish division (Sekar Katokichi).

Siteplan



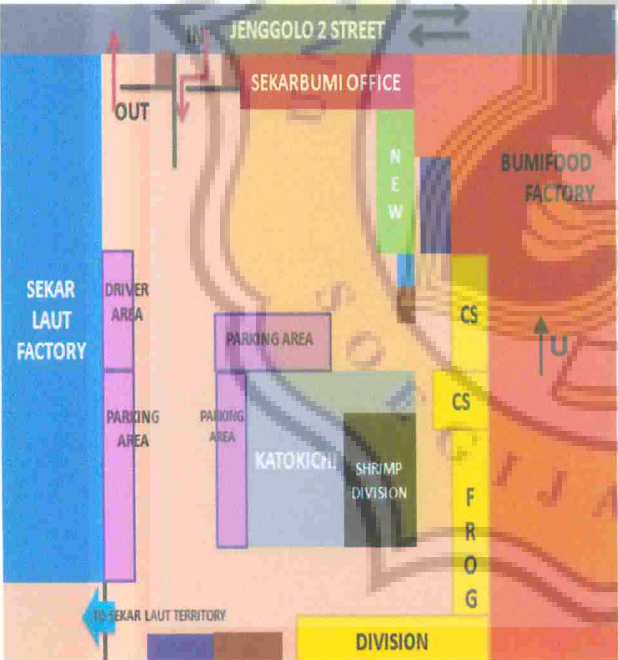
Fig 2.16 PT Sekar Bumi,TBK earth photo
(Source : private doc,2012)

This figure 2.16 is show the factory complex of Sekar Group which is located in Jenggolo Street while the PT Sekar Bumi,TBK is at Jenggolo 2.

This factories' site area is \pm 2 hectare and have several main buildings.

PT Sekar Bumi

As shown on side picture (fig 2.17), PT Sekarbumi is located at Jenggolo Street



2/17. PT Sekar Bumi is connected with Sekar Katokichi, there are boundaries of PT Sekar Bumi,TBK :

North : Jenggolo 2 Street

South : Circles Road

East : Bumifood Factory

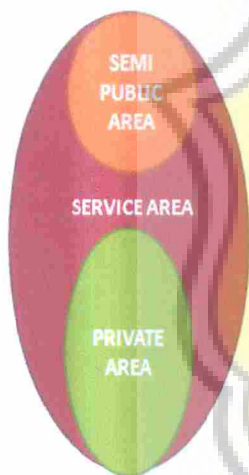
West : Sekar Laut Factory

Fig 2.17. PT Sekar Bumi,TBK layout
(Source : private doc,2012)

PT Sekar Bumi itself is building complex which is divided between the Office Building Administration, Frog Factory Division, and Shrimp Division. There are building and service building that exist in PT Sekar Bumi's Siteplan below :

1. Office Building
2. Frog Division
3. Sekar Katokichi (Shrimp Division)
4. Musholla
5. Cold Storage
6. New Building Construction (for warehouse)
7. Security Post
8. Machine Room
9. Driver Area
10. Parking Area

PT Sekar Bumi, TBK (Frog Division)



This Frog Division is factory that focus on collecting and procesing the frogs into frozen frogs and pack it into hardware package and took them into container. There are several rooms in Frog Division's building which is consist of collecting room, processing room, packaging room, and service area that fully support the activities.

There also macro zoning (fig 2.18) analysis for this frog division:

- Semi Public Area : Office Administration Building
- Service Area : Parking Area, Musholla, Machine Room, etc
- Private Area : Process Building and cold storage

The zoning of the factory itself is showing the boundaries between the semi public area and private area is divided by service area and the private area is place behind

in order to keep safe, clean, and secret to outside. Service area is located between the semi public and private also to support the activity and make a nearer access between both area to access the service places.

Frog Leg Factory

There are several rooms in PT Sekarbumi's frog legs factory which is made due to process that happend, they are :

1. Receiving Room (fig 2.19)

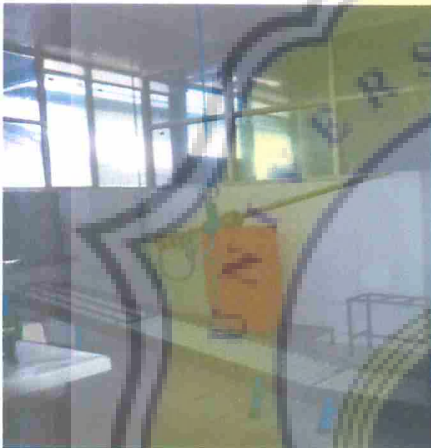


Fig 2.19 Receiving Room
(Source : private doc,2012)

This 3m x 3m room is consist of railing with 45° diagonal to accept the frog from supplier. This room is more like loading dock and boundaries between outside to cutting room. Receiving room is located beside the entrance for laborer.

The item in this rooms are measure, basket (45kg capacity), basket's railing, and sink

2. Entrance (fig 2.20)



Fig 2.20. Entrance to Proccess Area
(Source : private doc,2012)

Entrance room here means an entrance for laborer in process room. This entrance room has different split levels for washing boots, washing hands and cleaning the suits. This room's wide is 6m x 3m and has another function for security to check out the laborer's presence. There are 2 doors for entrance room which is a normal door from stainless and a partition from thick plastic. The item in this room are sink, a table and chair.

3. Washing Area (fig 2.21)

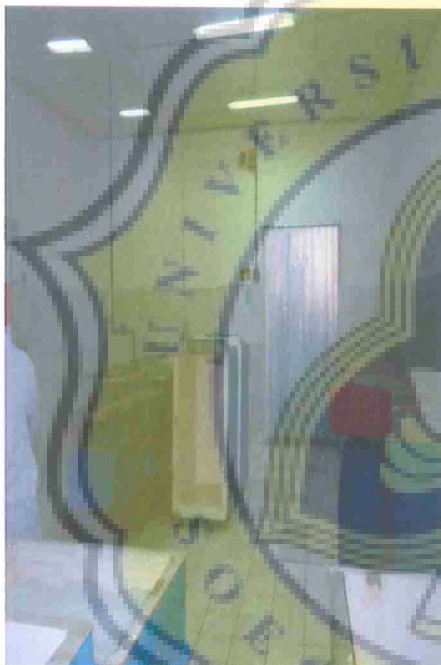


Fig 2.21 Washing Area
(Source : private doc,2012)

This area is connected to receiving room by railing machine's entrance and the first step from processing the frog legs that is to wash the frog. The frog leg washing machine's dimension is 1,5 m x 3 m and has capacity to wash 10 ton each day. The item in this room are frog legs' washing machine and fibre glass box (frogs temporary place before being wash).

4. Sanitation Area (fig 2.22)



Fig 2.22 Sanitation Area
(Source : private doc,2012)

Sanitation room is a small space with 8m x 10 m dimension in processing area that located near the checking room. This place is being used to store the Frog Legs'

baskets.

5. Checking Room (Fig 2.23)



Fig 2.23 Checking Room
(Source : private doc.2012)

This room is a large size of room to do the second step of processing which is to take the worms that is inside the frog legs. The checking room is divided into 2 space which is the first 9 cutting tables to cut and checking the worms and the second space is consist of 16 UV-Ray process tables to specially checking for worms.

6. Polybag Room (fig 2.24)



Fig 2.24 Polybag Room
(Source : private doc.2012)

Polybag room is a big room to pack the frog by using plastic then put it into freezer and then pack again with teritier pack by using paper bag. This place is located beside the checking room. The item in polybag room are freezer, packaging machine, cabinet for paper bag and plastic bag.

7. Anteroom (fig 2.25)



Fig 2.25 Anteroom
(Source : private doc.2012)

This room is boundaries between a room with room temperature and cold storage. This anteroom is consist a process table to divide the plastic bag by layer. This anteroom's item is process table, cart, also frog legs' basket.

8. Cold Storage (fig 2.26)



Fig 2.26 Cold Storage
(Source : private doc.2012)

This room is the main room of processing room because this storage is vital in this factory. Cold Storage is used for save the finished packing frog legs before being taken

to ship for export. This cold storage is actually separated building construction that specially designed to keep the room in low temperature. The dimentions of this cold storage is about $\pm 600\text{m}^2$.

9. Laborer Facility

Laborer Facility is designed to be rest area for laborer. The laborer facility is divided between man and woman corner. This area is consist of :

- Restroom (Fig 2.27)

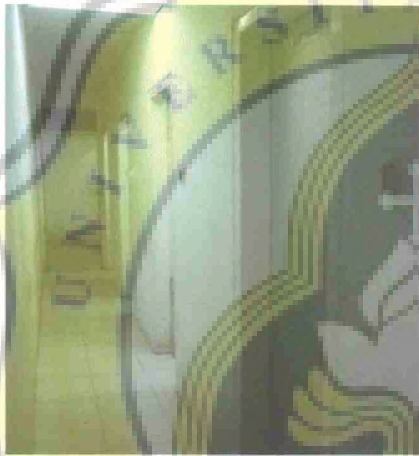


Fig 2.27 Restroom
(Source : private doc.2012)

- locker room (Fig 2.28)

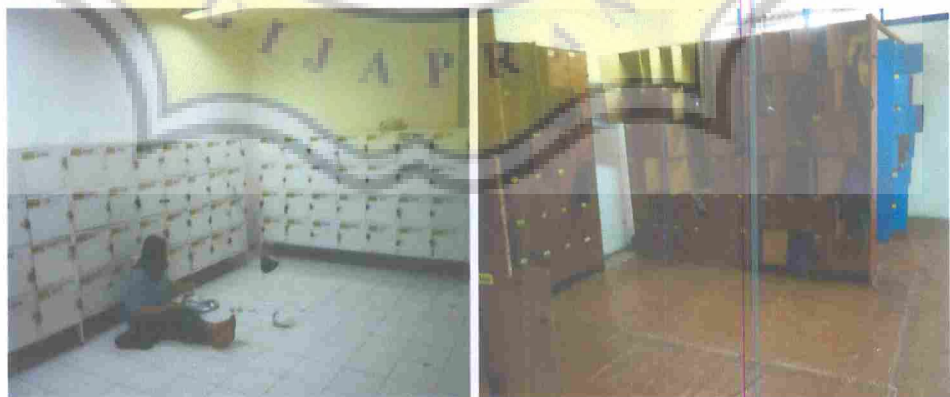


Fig 2.28. Locker Room
(Source : private doc.2012)

- eating corner (fig 2.29)



Fig 2.29. Eating Corner
(Source : private doc,2012)

- boots room. (fig 2.31)



- Healthy Corner (Fig 2.30)



Fig 2.31. Boots Room
(Source : private doc,2012)



Fig 2.30 Healthy Corner
(Source : private doc,2012)

- laundry
- dryer room

10. Service Area

Service Area is full supportive facilities that help the room for factory activities. The service area of this factory is located outside the process building, they are :

- Ice Maker Machine's space

A place to place the ice maker machine. It is located above the ice maker room and have a direct access to ice maker room which is designed to be filled by ice instantly.

- Main Panel Room

Main panel room is the room for main panel that store the electrivity need for whole buildings. Main panel support the electrivity for room's air conditioner, lights, computer, etc. As for heavy machine are connected to machine room.

- Machine room

Machine room is a service room which is consist of main panel for heavy machine. In this room is also storage for emergency electrivity's machine.

- Parking Area

Parking area is big space for supplier's truck, laborer's motor or bicycle, and cars to be parked.

- Security Post

Security post is lies in every junction of PT Sekar Bumi TBK in order to make a safe secure in everything inside the factory's siteplan.

- Rest Area

This rest area is made for supplier's driver to get sleep after a long way to factory or waiting the queue to process the frog legs' they brought.

Potentials and Constraints

As an cold storage factory, PT Sekar Bumi also have several potential and constraints for its building. Below are those factor :

The potential of PT Sekar Bumi,TBK :

- Hygiene Guaranteed building (Good drainage, UV-ray filter for the windows, etc)
- The processing room isn't being infected by direct sunlight
- Split level that support sanitation of the building
- Good Space organisation that follow the step of frog's process

The constraint of PT Sekar Bumi, TBK :

- The parking area isn't organized well (lack of parking area)
- The entrance for processing area should be different door for in and out (there's only one door)

2.2.6 Design Problems

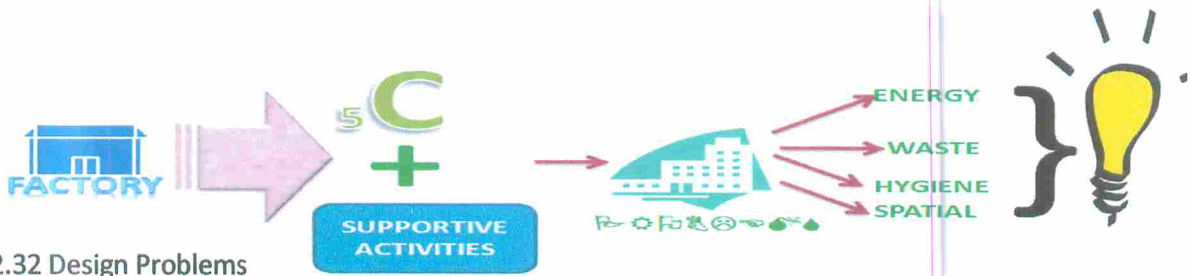


Fig 2.32 Design Problems

(Source : private doc)

From the fig 2.32, the problems can be seen as the result from the activities and need to be solved as well, they are :

- Energy problems, even though energy is a must to be use but the efficiency energy is needed in order to reduce the amount of energy that will being used and that is affected the sum of money that will be pay for operational also reduce the amount of fossil fuel that will be paid for conditioning the rooms.
- Hygiene and waste problems as result of factory activities that result a large amount of grey water.
- Spatial that will segment the element of building to design as luxurious building in order to please the buyer and guests, separation between private area and public area, etc.

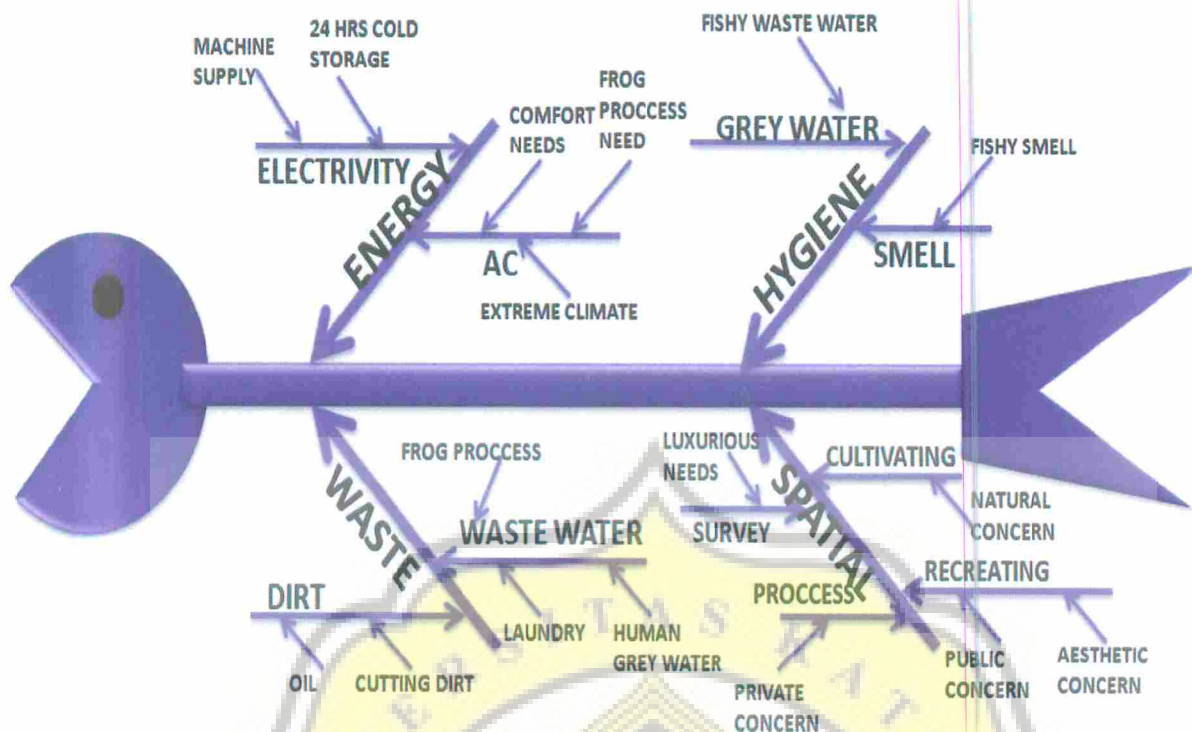


Fig 2.33. Fishbone Diagram
(Source : private doc)

All the problems will be the collecting and made the categorized for the problems in ⁵⁾Fishbone Diagram as fig 2.33 above. Comparison of the importance of it to find the finalist problems. After preliminary of some problems, the finalists problems is found which is between waste and energy. Both are important issue because that two problems can't be separated from factory's activities. And after once again being preliminary, the core issue is found which is the energy efficiency.

2.3 Conclusion

So, the conclusion will be making a develop factory which is start from cultivating but also collecting then processing and sell it abroad and locally. The factory that will be design will concern about the efficiency energy and also the aesthetic as a part of promotional for the buyer and guests that come to make a study tour.

The factory will be equipped by cultivating area, warehouse as supportive building for process the frogs also made some added value of frogs here.

Therefore, this building will have a water treatment technology as response to clean the environment and part of green design by using reuse water.

Assumption for this project :

- Budget and Price isn't matter.
- The circumstance of the frog itself is considered in the worst level (when the frog itself is reduced).
- The Cultivation Factory in this factory isn't supply the frog meats but stay cultivation research, however this factory is assumed to have cultivation area in different site (outside of the factory).

