

Transformation of Walk-up Flat Housing

For Industrial Workers in Tangerang, Indonesia

Andon Setyo Wibowo

Architect
Laboratory for Housing & Human Settlements, Architecture Department, ITS,
Indonesia

Abstract

The development of walk-up flats in the Municipality of Tangerang is an initial project to provide housing for industrial workers. The main reason to develop walk-up flats close to industrial area for workers in medium year term of occupation is to reduce the expenditure of transportation, food and room rental by sharing accommodation. The facilities to be provided in the walk-up flats are shared kitchens, common toilets, clothes hand-washing and areas on each floor.

The improvement of walk-up flats is a reform of the change of the users' target and the significant decline quality of rooms' uses and the number of users, occupation.

The paper is aimed to contribute to a successful development into strategy, actors and design aspects. Therefore, the recommendations will be based on three methods: relevant literature study, comparative study and design analyse.

To overcome the problem of land for Walk-up Flat Housing, where most is owned by the local community in the fringe area, local authority as a promoter should work together with the owners and share the management of flats.

The strategy to manage these flats after completion should involve the landowner, the local authority, industrial employers and employees. The flats management include the occupation and leasing system, maintenance, and organization of dwellers.

1. Introduction

1.1. Problem of Walk-up Flat Development



There are two different locations of walk-up flat projects funded by **Local Development Planning Board (BAPPEDA)** of Municipality of Tangerang, designed by the **Laboratory for Housing and Human Settlements (LHHS)-ITS**, and constructed by a private contractor. Both project were settled on private land located in large industrial area in Jatiuwung district, in JABOTABEK

region¹. The flats in both locations have to be accommodated by a three single workers in one room.

The first project is the two blocks of Walk-up Flats at Alamjaya sub-district and has been inhabited by trainee workers candidate of PT. Gajah Tunggal (the largest multi-trade and industry) in Tangerang. As expected in the current strategy, the number of users is 100 % in 2000, accommodated by two-single students in each room but at the same price as planned for three persons.

The second project with the same type of these walk-up flats was constructed at Manisjaya Sub-district, and has been occupied by workers from nearest factories, since 1998. In contrast compared to the first project, about 66.2 % of 154 workers brought their families to stay in 2 blocks of walk-up flats. The rest 33.8 % (52 persons) stays in 26 rooms of the two blocks. These two types of occupation were not predicted before as the previous design. The walk-up flats were for non-married workers.

The differences in term of occupation of both walk-up flat location which bring a more negative impact for walk-up flat at Manisjaya than positive impact are:

- ☉ The types of rooms' occupation were more complicated, a family and two-single dwellers stayed in one flats with the same room size.
- ☉ There is no organization of flats dwellers at Walk-up Flats of Manisjaya.
- ☉ There are several economic activities in rooms unit at walk-up flats of Manisjaya, which were not accommodated in flats, such as selling food, and daily goods.
- ☉ Children stay, play and make noise around rooms, corridors and stairs,

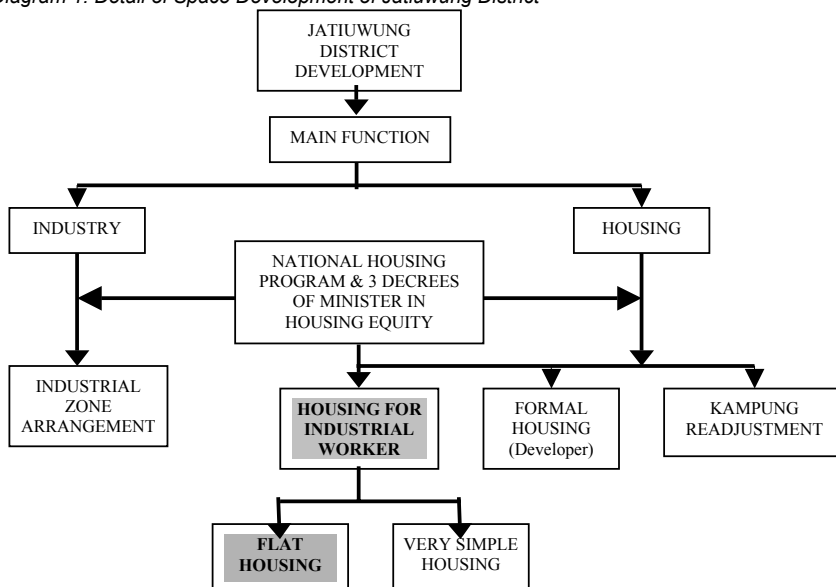
As a consequence of these problems, the flats occupation decreased sharply from 100 % inhabitant in 1998 to 50 % of it in 2000. Only the ground level and the first floor are occupied. There are also four blocks of flats, which are not finished yet.

1.2. The Housing Policy Background

The development policy refers to the significant growth of population in Jatiuwung district, which had about 201,000 inhabitants in 1990, and rose to 279,800 people in 1993 and will have a sharp increase to 650.000 inhabitants in 2005. The annual growth rate of industrial workers in this district during the period of 1990 to 2010 will be about 22.96 %.

The Jatiuwung Detail of Space Development Plan process (Unpublished, 1995) can be described in the following diagram:

Diagram 1: Detail of Space Development of Jatiuwung District



¹ The JABOTABEK region connects between a-three city of Bogor-Tangerang-Bekasi and Jakarta in term of economic and development relation.

The Municipality of Tangerang Urban Space Policy has determined the planning development for the Jatiuwung district during year 1990-2010 that this district will have the following five functions:

- ☉ Limited development zone
- ☉ City waterfront development zone
- ☉ Settlement development zone as industrial activity support
- ☉ Housing and industry mixed zone
- ☉ Industrial development zone

The area for industries is located to the southwestern of Municipality of Tangerang, in Jatiuwung District. This area is integrated to the city development as whole. The facilities provided in this area are: traditional market, health centre, elementary and junior high school, infrastructure and utility. The industries can be built in this site are non-polluted category, such as food and drink, garment, etc.

2. The Walk-up Flat Strategy

2.1. Existing Development Strategy

Initially, Walk-up Flat Housing development strategy introduced by BAPPEDA in Jatiuwung is based on three considerations. Firstly, the development should follow the district detail planning. Secondly, the development approach based on both rehabilitation of the physical housing conditions, bad environment quality, social approach and economic ability of workers. Lastly, the development consideration should be based on the labour work time, which about 60 % of a daily time is being used for working.

According to the Jatiuwung detail planning, land area provided for housing development until 2005 will be 1,612.4 Ha, but the available land for housing is only 1,473.5 Ha (Unpublished, 1995). The land used for industrial area will be of 3,863 Ha, double than housing area. It means that the housing development is confined by limited land space.

Therefore, local government through BAPPEDA as an initiator and as a fund provider only for construction should collaborate with local landowner. This sharing action between both stakeholders will have advantages to:

- ☉ *Land expenditure*; local authority will not expend money to buy a land.
- ☉ *Reduce rental price*; as budget is spent on land for the project component, room rental unit will be reduced as well.
- ☉ *Land sharing*; it will give more profit value for landowner to organize the land.

The second development approach based on land rehabilitation will improve the housing conditions physically and psychologically. This approach will also increase the possibility to improve living environment with its conditions, as the more efficient use of land space than in previous boarding house, developed by land owner horizontally and disorderly.

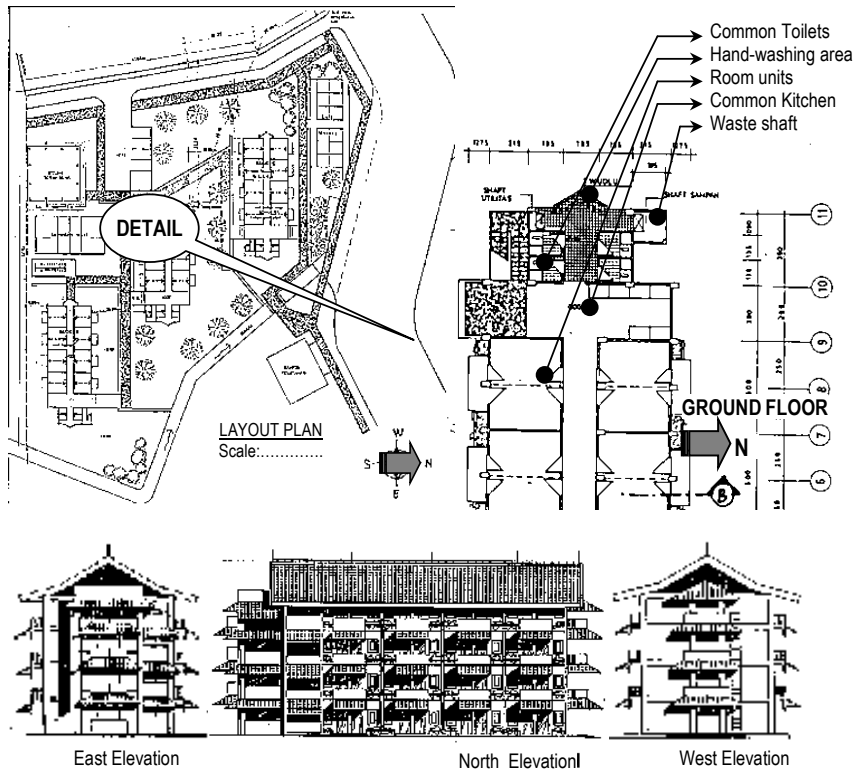
This second strategy should be followed by social approach by making dialogue and site survey randomly with boarding house dwellers to meet the best needs for walk-up flat facilities and rooms among others. In this stage the LHHS-ITS interviewed 50 workers in their boarding house. More important at this stage is to understand the average wage and expenses of workers, which based on local minimum wage of about US \$ 7,5 (US\$ 1.00 = Rp. 7,500.00) per week. With this wage they cannot afford the rent cost of the walk up flat, and need a small subsidy from the factory owner.

The third considerations of labour work time will influence on workers activities during post-occupancy in walk-up flats. Most workers spend much time in their room, after leaving the factory. The large factory normally uses the shift time system during the day, as follows: 07.00-15.00, 15.00-23.00, and 23.00-07.00. The medium scale one uses first-two-shift time, and the small industry work time only from 08.00 to 14.00. Less than half of them cook in boarding house. In the morning they do some exercise and in the evening some of them gather in the courtyard as a common space. Lastly, most of them do pray five times a day.

As a result of the activities and the needs analysis, the facilities and the infrastructures to be provided for the walk-up flats are:

- Room unit; occupied by 3 single persons per room. Each floor consists of 12 rooms, and one block of flats consists of four floors.
- Musholla (room for praying); provided on every floor,
- Shared kitchen; which several of them cook by themselves,
- Common toilets; which provide 4 toilets in every floor,
- Common area, in courtyard, and footpath,
- Hand-washing area, on every floor,
- Shaft for solid waste disposal
- Water reservoir, and electricity,

as it can be seen in plan as follows:



Drawing 1: Lay out plan, plan and elevation of Walk-up Flat

2.2. Upgrading Previous Development Strategy

The post occupancy evaluation of Walk-up Flats at Manisjaya will establish as a strategy, which should be conducted to transform physical, psychological and social impact to assess better living and environmental conditions. The strategy follows the order of the housing needs (Turner, 1979), and includes factory interest to accommodate their workers in walk-up flat, giving priority to the land consolidation, provide appropriate facilities, and better services². This order is divided into four stages:

Stage-1: Emphasising on factory owners' awareness.

Most of the factory owners in large, medium and small scale of industries often pay their workers in minimum local wage standards and put the workers' amenity of decent life in lower priority of their production process. As a result, most workers work in short to medium period (5-10 years), and after that they move to another factory, which give them higher salary. Therefore, factory owners prefer to offer to jobs young and fresh workers.

The first stage to upgrade the strategy is to reveal the factory owner, particularly around the second project site to develop decent housing for their workers. The

² According to the existential needs, people require four basic needs: land, services, house and people. The priority of the basic needs depend on the type of program or project.

factory owner of the first site of project can be an example to explain how to manage the occupation of their workers to another factory owners.

Stage-2: Local authority in collaboration with factory owner.

a. Elaborating data of:

- ☞ How many workers are interested to stay in flat house.
- ☞ How many workers will bring their family and how many of them are single.
- ☞ Worker's needs of room space, flats facilities and their activities within the flats.

b. Loan sharing:

- ☞ Local authority provides services and infrastructures, and factory owners invest in construction rehabilitation cost. In this case rental cost will be managed between factory owner and their worker. And as a cost sharing both local authority and factory owners should compromise in the agreement.

c. Budget supervision:

- ☞ Construction planning and process should be supervised together transparently in order to minimize over budget to address lower cost.

Stage-3: Local authority and factory owners in collaboration with landowner nearest to the industrial site.

- ☞ As a program of land consolidation, local authority should give priority to the land with lack of infrastructure and poor boarding settlements built on it.
- ☞ The number of boarding houses and the dwellers should be taken into consideration to accommodate the room numbers in walk-up flats.
- ☞ The development of land should also consider the relocation of boarding house dwellers during construction stage.

Stage-4: Transformations for Walk-up Flat and Services Management.

The detail of the strategy to reform the walk-up flats include programme for:

1. Physical upgrading conducted in collaboration between local government and factory owners:
 - ☞ To provide family rooms, by extending room space in the first and the second floor, or merge two closest rooms into a single family room.
 - ☞ To provide flexibility space for income generating activity in family room.
 - ☞ To provide a room office for community organization.
2. Social, Education and Health facilities:
 - ☞ To provide common space on the first floor or in the courtyard.
 - ☞ To provide small market which managed by women in flats.
 - ☞ To provide communication equipment such as telephone box.
 - ☞ To provide kindergarten for children.
 - ☞ To provide health care unit.
3. Security facilities:
 - ☞ To provide security shelter managed by community.
 - ☞ To provide fire protection
4. Establishment of community organization:
 - ☞ To manage rental rooms.
 - ☞ To manage solid waste disposal.
 - ☞ To manage building and facility maintenance.
5. Occupation management:
 - ☞ To meet 100 % of walk-up flats occupation target, local government, as the key actor of housing policy and financial provision should carry out of occupation problem. The target can be achieved by making cooperation with industrial employers around walk-up flats to use it for the workers. The reason is that the industrial employer will has some advantages such as:
 - ◆ To reduce transportation expenses,
 - ◆ The workers will have more energy to work
 - ◆ It will be easy to manage the worker activities time.

- ⇒ To evaluate post-occupancy conducted by the community organization lead to sustainable development of community to maintain the future walk-up development. The evaluation format is introduced by development consultant for community to do the 'self-survey'.

3. Actors

The actors' part in this paper reviews the existing role of actors in the existing of two locations of project. From the problem raised in the second project, it is evaluated in the sub-part of 'evaluation actors' role.

3.1. Existing role of actors

The two project of walk-up flat in Tangerang comprises two different sets of actors. The first project at Alamjaya, there are five key actors involve in the project from the first stage of planning until post-occupancy, consist of *local government, land owner, public development consultant, factory owner and their worker*, and *private contractor*. Those five actors have connection role among each other. For example:

First phase of development process (*planning & design*)

1. **The BAPPEDA (local government)** has an important role as a coordinator for development consultant, landowner and private contractor.
2. The **LHHS-ITS (development consultant)** conducted all tasks from local government from site surveying until making bidding document.
3. **Landowner** prepared the land data and situation for local government and development consultant.
4. These land data are processed to registered by **National Land Board (local government)** and are analysed by **LHHS-ITS** to design and to plan budget.
5. The final design and budget planning are being discussed among **local government, landowner, development consultant** and **private contractor** to manage project finance, construction process and rental system of post-occupancy.
6. All project budgets will be financed by local government loan expenditure in long term (15 years).

Second phase of development process (*construction*)

1. **Local government** relocates existing dwellers of settlement during construction and give compensation to **land owner** for demolishing existing rental rooms.
2. As tasks given by local government as project client, **private contractor** should finish all physical construction process in 5 months.
3. All construction process is supervised by **Local Public Work Department (local government)** and **private consultant**.

Third phase of development process (*post-occupancy*)

1. The **BAPPEDA** on behalf of local government resettle the previous settlement dwellers to inhabit the first floor of flats.
2. The **BAPPEDA** delegated **Local Housing Department** to collaborate with **factory owner** to make an agreement for walk-up flat rental for factory's worker.
3. **Factory owner** establish a legal organization of their **worker association** to sign an agreement contract of rental flat between **worker organization** and **Local Housing Department**. The payment will be managed by worker organization. **The workers** as the users have duties to maintain the building, keep clean, manage waste disposal and do some social work on site.
4. As benefit collaboration between local government and landowner, 15 rooms of total 96 rooms rental cost is a more profit value for landowner compared to previous rental settlement.

By contrast, there are four actors in second project, which lack interaction among each other. The main actor is local government, which dominate the role of the three phases of walk-up flat development. Local Housing Department has a direct contact to personal worker to offer room to rent and there is no role of factory owner of

rental process and progress of their worker. And even worse, there is no rental management in the second project. Local Housing Department is also welcome to the worker's family to stay even though the room unit is not appropriate for a family occupation.

It is noticed that most of factory owner are not aware of their workers' conditions and satisfaction. Most of factory owner allocated their worker's wage in minimum salary standard, that most of workers couldn't obtain their need of housing. As consequence, most workers do not want to work in factory in long term. The average work time is about 5 to 10 years. And after that they try to find better salary in other factory.

3.2. Evaluation of actors' role

To establish a comprehensive development network among all actors in developing and transforming walk-up flat, it is important to extend each actor's role and give interconnection among their roles. The detail of recommendation of actor's role description will be explained in the following discussion.

The extension of role will explain more detail about the role of every actor in 'which part' of process they should take part and in 'what way' they should do their tasks. The interconnection role will explain and make each actor to be aware of 'with whom' they should work with and 'to whom' they have to be responsible.

The matrix below shows the possibility of each actor to participate in three stages of walk-up flat development & transformation for industrial workers and opens various actors to take part in the development.

The role of local government

Actors in local government sector consist of BAPPEDA, National Land Board, Building Department, Local Public Work Department, Local Housing Department, and Local Cleanliness Department. Every department is involving in particular part of development stage. One of department can be a key actor because its position is very important. For example Local Housing Department become a key actor in 'post-occupancy' process in the third phase. This department make an agreement among related actors, such as worker organization, landowner and factory owner if the factory owner has contributed in project finance.

BAPPEDA

The BAPPEDA as a key actor for local government has the most important role in the three-development phases. This board involved in most part in three phases of development. There are three most important roles before entering the first phase. First role is to encourage factory owner to be aware to their labour needs for housing. Second role is to coordinate meeting among all key actor involved in the development.

In the phase of *planning and design*, this board participation is:

1. To describe what actors are in this project and what is the role of each actor.
2. To coordinate stage of land survey, land planning and plotting.
3. To monitor the progress of land registration and building permit which registered by National Land Board and Local Building Department. In this process, it is important to cut the bureaucrat ion process and cost of registration.
4. Together with factory owner, worker association representation, development consultant and related department to decide what kind of facility and infrastructure should be provided.
5. If possible, it is important to share, discuss and manage the project budget together with factory owner, which has been planned by development consultant.
6. Together with factory owner, Local Housing Department and landowner to design the financial management and agreement.
7. To execute procurement and bidding process to select supervision consultant and private contractor.

In the phase of *construction*, the BAPPEDA participation is:

1. Together with private contractor to execute relocation and compensation for worker dwellers and landowners.
2. To monitor and construct and supervise the process through Local Public Work Department.

In the phase of *post-occupancy*, the BAPPEDA participation is:

By the same role as NLB, Local Building Department (LBD) responsible to register and produce building permit for builder. This department has a certain cost rate for particular land location and type of building material. Definitely, the department charge the registration cost for low-cost housing in lower price.

Local Public Work Department (LPWD) is a technical government institution, which involves in all physical activities, such as: determining shelter services, minimum standard of building facilities, and supervising procurement requirement and physical activities.

Local Housing Department (LHD) is an administrative local government department, functioned to register the housing number in the city, to manage public housing asset and to manage public rental house.

Local Cleanliness Department (LCD) is responsible to manage the city sewerage disposal, collaborate with community organization. This department responsible only for disposing solid waste from temporarily waste collection located in every neighbourhood unit. The solid waste disposal from house to the temporarily waste collection is responsible to the community.

The role of the public enterprises

All public enterprises in Tangerang provide the city services, such as drinking water, electricity, and telephone line. In case of low-income community, public enterprises only provide drinking water and electricity. The telephone use is a luxury need for them, and is impossible to provide. In the walk-up flat development phase, Public Electricity Enterprise and Public Water Enterprise participate in shelter service planning and construction under the BAPPEDA coordination and the LPWD supervision.

The role of landowner

Since the limited land for housing in industrial area become an obstacle for housing provision, the role of landowners becomes important. The solution offered by local government is to collaborate with landowners particularly to improve shelter condition and to give beneficiary value to them.

The landowner development participatory for the project are to give information of the land existing and obtained the right to participate in facility provision, such as food stall and daily shop. Landowner also involve in the rental agreement as well as his land contribution to the project.

The role of factory owner

There is no role of factory owners in the second location of project. The housing for workers is last priority of production cost. It is an exception for the first project at Alamjaya, that the factory owner aware to the labour needs as well as the part of enhancing production profits. The first project is a good example for the next stage of housing project for industrial worker.

The factory owner of the first project is a key actor for the next housing provision for labourer of factory. They can share the successfulness of the first project to other factory owners. They also become a key actor if they share the financial project with local government as a part of a non-profit project. As the key actor, the factory owner can participate to the project activity such as: determining building facility and budget planning, managing project financial, selecting the contractor and supervision consultant, and share the idea of the rental agreement content.

The role of development consultant

Development consultant from technical university has more advantage compared to private development consultant. The first advantage is the low salary of the professional market standard. Secondly, technical university has community work service activity, conducts some research and project evaluation. In this case the LHHS-ITS involve in almost all phase of development activities as can be seen in above matrix, except: land registration and building permit process, room rental arrangement, building maintenance cost, and waste management activity. Furthermore, LHHS-ITS aware to tackle the project sustainable evaluation such as: empowering user's organization process, evaluate community activity of post-occupancy and community satisfactory.

In this case, local government can point out the development consultant as a supervision consultant in order to minimize the budget of the project.

The role of worker community

AS the main subject of the project, the worker community should take part in the development phases in the following process:

1. To determine the room needs and building facilities should be provided for their activities.
2. To develop and to improve their community organization in the first phase and post-occupancy by using the principal of simple community organization proposed by UNDP³.
3. To participate in building maintenance and waste management.
4. To improve and encourage women organization activities of post-occupancy.

The role of private contractor

The most important role of private contractor is in the second phase of development as can be seen in the matrix-1. The participation in the second phase should include the good cooperation and relation between contractor and other actor such as: development consultant, landowner and the client; maintaining the material quality and to obtain all the project procurement.

4. Reforming the Design

The users of the walk-up flats in term of the worker and their families occupation in medium term of 5 to 10 year is a key discussion in the walk-up redesign process. The result of walk-up flat design for medium term users will be much different compare to it for permanent users. The temporary users is much more complicated in case of the change of activity, room needs, family size, and social interrelationship. Again, it is more complicated if the existing of buildings are not flexible to change and transform.

4.1. Setting up the change of existing walk-up flat

In the second location of project, since the room uses is not suitable to obtain family's activity, the walk-up flat needs to redesign. The design set-up should be based on adequate information of families activities, efficiency and effectivity of families' activities, their affordability to lease the room units, individual responsibility to maintain the room units, and possibility for community to change or design their future needs. And not less important that design transformation consider to microclimate and adequate of building material provision.

Adequate information workers' families activity

There are some categories of factors to be noticed as the elements to determine the families need related to the design transformation of walk-up flat. These factors are designed as a compendium of questionnaire as a tool to interview the will be users⁴. First category is *family background*, comprises ages of household, marital status, religion, education background, type of worker's company, type of main work, secondary family's economic activity and number of family member with their ages.

Second category is *family activity*, comprises working time of household; activity in flats such as cooking, cleaning, washing, praying, washing, bathing, ironing, sewing and children's activity; social, culture and outdoor activities. This questionnaire will build the image of the possibility to create room in flexible uses.

Third category is *income and expenditure*, comprises monthly household income, family's income generating activity, and household expenses for food, electricity and water uses, education fee for children, transportation and others. The aim of this questionnaire is to determine what kind of house is afforded for the family.

Fourth category is *organization and management activity*; include existing community organization, women organization, solid waste management, and building maintenance management

³ The IDEALS prepared by UNDP is to propose the institutional development and empower all local stakeholders in community level. It is now a model of national programme.

⁴ The interview method with different type was carried out by the SADEL (Andersson, L.A. et all, 1986) as a tool to make housing standard.

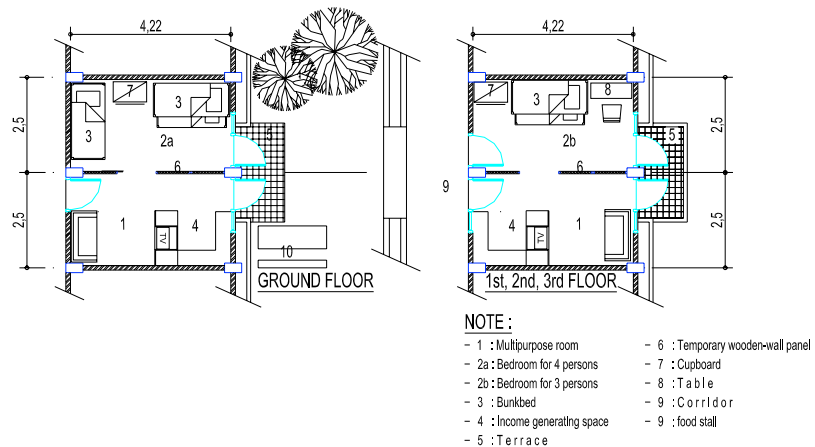
The last category is *subjective questionnaire*, i.e. what is the meaning of house, what is their opinion about rental housing, how does their neighbour influence their life, what is their opinion about the existing of building facility, and what are their expectation of their future house, life and their environment.

Indeed, the conclusion of the data compilation from these questionnaire is not to generalize the type of room units neither to minimize the building facility. It should create an idea to design the optimal room and space for all users and the possibility to expand the idea for future activity, and should comply with minimum standard of flat houses and local regulation.

Adequate room and space for families' activity

It was evaluated that the room units was design for flexibility uses. Each two-room unit is separated by a line of temporary wall, creates the possibility to combine both rooms. One room can be used as bedroom with one bunk bed plus rolling bed use for three to four persons⁵. Another room can be used as multipurpose room, such as living room or room for income generating activity, as can be seen in the drawing-2 below.

It is a fact that most family put and keep their shoes, house tools and kitchen's equipments in the corridor, outside of room units since they cannot find the place in the room units. To solve this problem, development consultant should provide the possibility design for community as a self-help scheme to make a small simple wall-cabinet to keep all things.



Drawing 2: Redesign Plan of Walk-up Flat

Income generating activities can be proposed at two parts of places. First part is these, which have public activities characteristic such as food stall and selling cakes. The space for these activities can be extended outside of room unit (*see drawing-2: Ground floor*). Second part of place is these, which have semi public activities characteristic such as small-scale home industry related to the factory around the flats, tailor-made, etc. The place for these kinds of activities can be located in multipurpose room.

Adequate building materials choice for simple walk-up flat

The walk-up flat design is divided into two part of construction design (Caminos and Habraken, 1986), i.e. support and infill⁶. Since most support structure of building expend more than 52,5 % of the total building cost (Unpublished, 1996), it is much more expensive to build low-rise houses for low-income people.

The main structure for walk-up flat is rigid concrete-frame supported by shallow concrete pile. Hollow bricks as outer walls fill these support structure and all brick walls are exposed to minimize the building cost. This support system is constructed

⁵ Based on the fact that most families of walk-up flat users are in young age up to 40 years and have one to two small children. The average household size in Tangerang is 4.63 person (Unpublished, 1996)

⁶ The two parts of building design are support and infill. *Support* is a part which is community can not construct, and should be conducted by contractor. On the other hand, *infill* is a part which only community can decide their need and arranged by themselves.

by private contractor. Floor for this flat is made of concrete slab, finished with cement tile. Roofs material selected from available local material is made of burn clay.

Adaptable to micro climate

All blocks of walk-up flat are designed by using the passive thermal comfort principle to reduce the use of energy. As can be seen at *drawing-1*, the walk-up flat houses face to a west-east orientation for narrow facades. In fact, the temperature distance between night and day is a slight different. The average of micro temperature is between 24°C to 32°C.

All windows face to north and south to avoid the highest temperature in the afternoon. The room units are placed to the east of common room such as hand-washing area, toilets, kitchens, staircase and *musholla*⁷, to avoid direct heat from the sun.

A short corridor is designed with the width of 1.80 m in the middle of two rows of rooms, to bring sufficient indirect light. The windows are designed to make cross ventilation by the low opening at outer side of wall and a high outlet opening at another side to cool human temperature. Balcony and canopy provide shade to the windows and doors underneath to protect direct heat from sun and rain.

The common area such as kitchens and *musholla* is covered by a 180 cm height of wall to create air movements across the flat block.

4.2. Possibility for community to design their needs

The users' often bring their furniture more than the capacity of room space. In this case, development consultant should provide some example for the user to design removable wall and interior furniture placement. By using these example users can set the infill part as detachable unit in conformity with their need. It is very important for the users to involve to participate in this process to build an image and to give experiences of the future needs of room arrangement.

The materials use for detachable units are: removable wood-wall panel, wall cabinet, bunk bed and cupboard.

4.3. Affordability for building cost

Based on the data established by the Statistic Centre Bureau for the JABOTABEK region, the average expenditure of poor household is US\$ 25.7 per month. The house rent expenses to expenditure ratio is 24 %. It means that every household should spend about US\$ 6.62 per month to rent room unit.

The cost construction of each room unit with space of 10 m² is approximately US\$ 2,000 include site development. If the project funded by budget of local government or factory owner expenditure with no interest included (non profit project), the minimum term repayment of project would be 25 years and 2 months. It means that each worker needs subsidy form factory ownerto afford the rental cost and should have income generating activities.

Conversely, if each unit room occupied by a three single worker, the minimum term repayment of project would be 8 years and 4 months. By the 10 years rental payments, a part of it can be used as a cost for building maintenance.

5. Conclusions

The strategy to develop the walk-up flats for industrial workers should be more specific. Using the same strategy as to develop these ones for workers' family occupation cannot develop these flats for single workers. Improvement for mixed use of walk-up flats can be achieved by implementing the sequence of action plans such as: collecting adequate specific information involved all type of users, selecting workers who can afford rental cost for family occupation, redesigning together with related users, planning the future uses of room spaces, and reconstruction process.

These sequence of action plans involve actors of workers' community as decision maker, development consultant as planner and to empower the community, factory

⁷ A small room for moslem to pray.

owner as provider of fund in term of rental cost subsidy, local authority as enabler, private landowner as land provider and local contractor as builder.

Finally, the post occupancy process should be evaluated continuously by using POE format to maintain the sustainability of improvement of living conditions. The POE can be a tool of reference to develop the similar project in another site locations, but the strategy of development cannot be replicated.

6. Recommendation

By means of the successfulness of first location of initial walk-up flat project and the failure of the second location of the same type of project, local government as a key actor should reform the strategy, interrelation of involvement of related actors, the type of walk-up flat design can afford the minimum wage of factory workers and decide which users can occupy the walk-up flat.

The first important stage of the strategy is local government should reveal the factory owner that their workers have a right to stay in decent place. The local government should collaborate with private landowner within the programme of land consolidation and limited land available consideration.

There are three phases of participatory for key actors in construction process and post occupancy. In the first phase of planning and design, local government as coordinator become a decision maker in most certain activity, instead of factory owner and workers. Second phase of construction, private contractor should collaborate with all actors in certain activity. As a result of community development activity, workers community should participate in design process, occupation stage, some activity of income generation, social and maintenance management.

The design reform of the second location of project should be based on adequate information of workers and their families activities, the users satisfaction, the possibility of workers' family to create income generating activity within the occupancy period and the possibility for users to design their future furniture needs within limited room space.

Furthermore, to enhance the factory owners' participation in housing provisions for their workers, local government's strategy can be conducted are:

- a. **Incentive programme;** by reducing the building permit administration fee for factory expansion, advertisement fare, or annual taxation.
- b. **Disincentive programme;** to fine factory owners in condition of their workers on strike.
- c. **To raise local wage standard and to establish worker's saving programme.**

These programme expect to factory owner to raise the worker's wage in order to establish worker's saving and to subsidy the rental cost in medium to long-term occupancy for housing.

The flat housing for industrial workers programme should also consider to the worker's intended to have legal right of occupation process and future expectation to have unit in the walk-up flat housing as a property.

Finally, the more complex of types of occupation, the more detail the occupation's rule should be established. Therefore, local government officer or factory owner's, as manager should establish the specific agreement of walk-up flat occupation as well.

References

- Andersson, L.A., et all
1986 *A Solution to Rural Housing Problems*, Swedish Association for Development of Low-cost Housing, Lund, Sweden.
- Brett, S.
1974 *Low Income Settlements in Latin America, the Turner Model*. In E. D. Kadt and Williams (eds), *Sociology and Development*, London, Tavistoc.
- Caminos, H. & Habraken, N.J.
1972 *Supports: an Alternative to Mass Housing*, The Arch. Press London 1072.

Habraken, N.J. et all

1976 *Variation: The systematic Design of Support*, MIT Press London.

Silas, J.

1999 *Institutional Development for Empowerment among Local Stakeholders (IDEALS)*, UNDP.

Turner, JFC, Fichter, R.

1972 *Freedom to Build*, The Macmillian, New York.

Turner, JFC.

1976 *Housing by People*, Pantheon Books, New York.

Unpublished

1995 *The Jatiuwung Detail of Space Development Plan*, The Municipality of Tangerang.

Unpublished

1996 *National Report for Habitat Agenda II*, National Committee for Habitat II the Republic of Indonesia, , *annex 1*.

Wibowo, A.S.

1995 *Housing for Industrial Worker in Municipality of Tangerang*, a paper for JICA International Training advanced for Integrated Technology for Housing Strategy, Bandung.