Housing for Human Security as a resiliently sustainable initiative

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Foreword-1

Kazuo Iwamura and IWAMURA Atelier started developing so entitled "Environmentally Symbiotic Housing (Iwamura et al., 2000, 2009)" as a national initiative of Japan in collaboration with academia and industry in the year of 1990. The trigger was the Japanese cabinet's project coping with the Global Warming (1990). In between to date, Japan has experienced a number of tragic natural disasters.

Learning from those experiences, it should be recognized that the sustainability of housing and community be holistically elaborated within a sequence of time, 1) Disaster 2) Aftermath 3) Ordinary Time only that we usually tend to take into consideration.

Foreword-2

Dr. Sadako OGATA, former United Nations High Commissioner for Refugees, organized and led a committee for Human Security (Oagata, 2002, 2005), which must be placed as the top priority beyond anything.

The author, inspired by her thought that should be considered also as the very basis for our any initiatives related to housing and community development, is now being committed to achieving "Resiliently Sustainable Housing for Human Security (Iwamura, 2012)."

Major Natural Disasters around the World since 1990

as of August 30th, 2011

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Major Natural Disasters around the World since 1990 (more than 5,000 dead, as of Aug. 31st, 2011)



Major Natural Disasters in Asia & Oceania since 1990 (as of August 30th, 2011)



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Life Continuity Plan (LCP)

Given the above, it must be recognized that we are always confronted with disasters, both "Natural" and "Daily." Taking this into consideration, how should we plan and design sustainable housing and community?

Related to this query, **Business Continuity Plan (BCP)** gives us a hint, which means the following ;

"When business is disrupted, it can cost money. Lost revenues plus extra expenses means reduced profits. Insurance does not cover all costs and cannot replace customers that defect to the competition. A business continuity plan to continue business is essential".

The author proposes similar initiative, replacing "Business" by "Life," namely "Life Continuity Plan (LCP)" to take care of the holistic planning and design of resiently sustainable housing.

Life	Dhasa	Itomo	Housing Lev	/el Measures	Community L	evel Measures
	Phase	nems	Detached	Collective	Neighborhood	Region
Continuity		Earthquake				
		Tsunami				
Plan (LCP)	1.	Fire				
[)	At Disaster	Storm	First a	hasic fra	ma has h	<u>000</u>
		Flood	i not, a			
		Landslide	develo	ped to gra	asp at a g	lance
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Housing		Tap Water	Solied	nonzonia		
for	Aftermath	Sewerage System	the sca	ale (from a	a detache	d-
		Toilet	house,	an aparti	ment, a	
Human		Traffic	neighb	orhood, t	o a regior	n), and
O a sumitive			vertica	llv to the	time-line	from
Security		Provisions	at a die	astor aft	ermath t	
		Physical Health	ardina			Ja
		Physical Security	ordinar	y period,	which are	9
L	3.	Mental Health	always	cyclically	/ repeated	<u>d).</u>
) Ordinary	Peace of mind				
	Time	Crime Prevention				
		Maintenance				
© Kazuo IWAMURA		Periodic Inspection				

1. Measures as disaster preparedness

	Housing Lev	Housing Level Measures		Community Level Measures		
	Detached	Collective	Neighborhood	Region		
Earthquake	Seismic proof, Fixing furn	Seismic proof, Fixing furniture		Ground stability, Ground improvement		
Tsunami		Rooftop evacuation	Highland relocation, Learning from the past			
Fire	Fire proof, Fire prevention	Fire proof, Fire prevention, Firebreak trees on site		Firebreak forest, Open space, Water reservoir		
Storm	Wind relaxation		Windbreak, Weather forecast			
Flood	Water proof, Flood preven	Water proof, Flood prevention		High water measures, Building code, Weather forecast		
Landslide	Site investigation, Building location		Site diagnosis, Building code, Hazard map			
Evacuation	Shelter, Emergency exit	Evacuation route, Drill	Evacuation site, Drill	Regional evacuation site		

In italic: non-physical measures

2. Measures for aftermath of disaster

	Housing Level Measures		Community Level Measures		
	Detached	Collective	Neighborhood	Region	
Place of refuge	Temporary housing, Making use of vacant housing		Temporary or replaced housing		
Energy sources	Diversification, Independent and dispersed sources		Micro grid	Semi-micro grid	
Energy supply	Energy saving, Energy storage, Smart housing		Smart grid		
Tap water	Use of rain-water, underground water, Water storage		Stock shelter		
Sewage	Septic tank on site		District's independent purification system		
Toilet	Underground pit, Portable toilet		Stock shelter	Security center	
Traffic	Bicycle sharing, Housing for all		Logistics of requirements, Car sharing, Community bus		
ICT	Diversified communication methods		Social network, Cloud computing		
Provisions	Private stock	Collective stock	Stock shelter	Security center	

In italic: non-physical measures

3. Measures for ordinary time

	Housing Level Measures		Community Level Measures		
	Detached	Collective	Neighborhood	Region	
Physical health	Indoor thermal environment, IAQ, Lifestyle		Greening, Heat island effect relaxation		
Physical security	Barrier free, Accessibility		Universal design, Accessibility		
Mental health	Inter-generation exchange	Residents' exchange	Community	Administrative support	
Peace of mind	Comfort, Greenery, Biotope, Lifestyle		Town-scaping	Regional landscaping	
Crime prevention	Crime preventive performance		Neighborhood relation		
Maintenance	Management service	Management association	HOA, Area management	Administrative support	
Periodic inspection	HEMS, CASBEE evaluation, House report		CASBEE evaluation	CASBEE evaluation	

In italic: non-physical measures

Technical measures of Housing for Human Security

The following is the list of technical measures, which could be applied to the housing project of "Koyankus."

- 01. Seismic-proof
- 02. Ground safety
- 03. Snow protection
- 04. Wind relaxation
- 05. Fire prevention

- 06. Energy for emergency
- 07. Emergent life support
- 08. Health promotion
- 09. Environmental design
- 10. Community design

1. Seismic-proof design

Based upon the experiences of serious seismic disasters to date, seismic proof technology has been developed even for lowrise housing including 2 story detached houses as below.

- 1) Structural seismic design
- 2) Base insulation
- 3) Vibration damper device





2. Ground & soil safety

According to the given ground condition of the site, appropriate measures should be taken to improve the ground & soil stability against seismic ground failure through; 1) Ground & soil improvement

2) Adjusting device of differential settlement etc.







3. Snow protection

Snow damage on house and residents should be avoided according to the local climate data to date. Major consideration is to be done to the roof form to hedge the risk of slipping down to the earth through;

 Steep roof allowing the snow slipping down with gravity
Flat roof allowing the apow to be

Flat roof allowing the snow to be blown by the wind

3) Active measure applying heating system to the roof and/or eaves to avoid icicles hanging from the roof



克雪住宅では基礎が高く、屋根が急勾配になっている ものが多い。雪が積もっても出入口が面がれず、また 屋根に載った雪も自然に落ちる。

4. Wind relaxation

Almaty is located North to Tian Shan, and is characterized by the influence of mountain-valley circulation, which is especially evident in the northern part of the city, located directly in the transition zone of the mountain slopes to the plains.

In winter, therefore, prevailing wind direction is from the south to the north, which should be relaxed by means of;

- 1) Tall trees planting
- 2) Hedge

Exterior wind shutters etc.

On the contrary, the prevailing wind in summer should be utilized to relax the hot climate through the housing layout and the opening design.



5. Fire prevention

Fire prevention measures are to

- 1) Avoid outbreak of fire and
- 2) Prevent the spread of a fire.

The former includes to equip the house with all electronic home appliances or even a fire-sensing gas range (c.f. right below)

The latter includes fire and/or smoke sensors at the ceiling of each room (c.f. right above).





6. Energy for emergency

Energy supply in aftermath of disaster is a key issue for living. LPG bulk system is evidenced efficient for provisional energy supply associated with

- 1) Combustion unit
- 2) Hot water unit
- 3) Power generator unit





Potable water purifier

7. Life supports for emergency

In the aftermath of a disaster, life support infrastructure (e.g. water & energy supply, sewer) is damaged and out of use for certain period.

Especially, toilet system is a key issue related to human dignity. Photo on the right shows a temporal toilet installed right on a manhole of sewage disposal pipelines.





8. Health promotion at home

The indoor air of a house is unexpectedly contaminated through chemicals contained in the building materials and furniture, as well as dust and mold caused by moisture.

So called "Sick-house Syndrome" has been a serious problem for the residents' health, which is evidenced especially in an air tight house. The measures include;

- 1) Low VOC materials
- 2) Efficient and constant air ventilation
- 3) Well balanced interior air temperature control



9. Environmental design

Environmentally conscious design is a major trend of any housing provision for both reduction of environmental loads and enhancement of QOL with regard to the sustainable built environment. This could be realized through the following design process;

- 1) Discover the locality to be respected in the landscape
- 2) Accordingly design the shape & performance of house
- 3) Adopt necessary equipment and appliances
- 4) Support the house management by the residents









10. Community design

In the aftermath of any disaster, it was evidenced that the mutual help of neighborhood residents was indispensable for the recovery.

Such relationship is only possible if there is a sense of community among residents to be matured through regular communal activities in common spaces within the neighborhood block. They include;

- 1) Monthly town cleaning
- 2) Maintenance of greenery
- 3) Birthday parties
- 4) Local & religious festivals

5) Town workshop for children etc.



Common square for community activities

Town management system for safe & sustainable living

- 1) Town Management Process
- 2) Maturing Process of the Community
- 3) Phenology Guide
- 4) Risk Management
- 5) Information Network

1) Town Management Process



2) Sustainable Town Management as maturing process of the community

Greening Workshop



Periodical workshops about the greening neighborhood provide natural relationship between residents.

1



Communal Planting



Plating trees and flowers to celebrate the new occupancy help residents enhance their feeling of attachment to the town greenery.

Such a communnal program provides them opportunities to get acquaintance and to work together.







3) Phenology Guide for discovering the best specific solution

As a part of the Pre-design phase, the natural conditions of the site and its region are investigated in detail. These include sunshine duration, winds, precipitation, temperature, humidity, flora and fauna; the products of the solar benefits. The outcomes of analysis on such local information help discover the optimal solutions for the regional networking of greenery and water systems for example.

Furthermore, the sociocultural aspects as the results of the people's activities are investigated to understand the *genius loci* that lead to the best solution of architectural layout, design and post-occupancy management.



Phenology Guide of Kobe: Phenological list of natural & socio-cultural locality in Kobe

4) Seism-proof Structural System

applied to all houses

to considerably reduce the earthquake damage risk



6) Structural Monitoring System



Aftermath voluntary contributions of architects

1) Shigeru BAN

2) Toyo ITO



1) SHIGERU BAN ARCHITECTS Voluntary Architects Network (VAN)

Paper Partition System designed and provided by Shigeru BAN for human dignity at Ohtsuchi High-School's gymnasium as an aftermath refuge, set up by the refugees themselves



Before



The Paper Partition System for aftermath refuge, after occupancy



© SHIGERU BAN ARCHITECTS





Meeting Hall

Onagawa Exterior

Onagawa Interior



housing and community facilities, using shipping containers, promoted and designed by;

SHIGERU BAN

carries international respect for applying his ability in technology in architecture to not only serving the more affluent users of architecture but also to a creative exploration of shelter using paper tubes and membranes for disaster relief. He has received "Plitzcker Architecture Prize 2014" for his accomplishments.



Paper Church (1995-2000) Kobe, JAPAN

© Hiroyuki Hirai



i Cardboard Cathedral (2013) © Bridgit Anderson Christchurch, NEW ZEALAND



2) TOYO ITO

Since Mar.11th, 2011, he has been energetically committed in relief and recovery activities in the affected regions.

"Home-for-All" projects are among them, providing a place for peace of mind for the victims to meet and communicate each other.

10 "Homes-for-All" have been completed by Jan. 2014, whilst a few are under development.

Recent major awards;

-Architectural Institute of Japan Prize 2003,

- -Royal Gold Medal from the RIBA 2006, -Golden Lion Prize at the Venice Biennale
- 2012,

-Pritzker Architecture Prize 2013, and many others



TOYO ITO (2013 Pritzker Prize-Winner) & ASSOCIATES, ARCHITECTS Initiatives of "Home-for-All" Networking

The 1st Home-for-All (Oct. 2011), built within a temporary housing site in Sendai



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Built in a temporary housing site, it comprises 3 tiny characteristic pavilions. It is expected for kids to grow and become key-players of their community recovery.

Home-for-All in Iwanuma, Jul. 2013

It was completed through a collaboration of an ICT company in Tokyo and a local NPO aiming at recovery of agriculture.

Enjoying farming and foods using ICT, it is utilized as a place for the next generations to take over the local agriculture.



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Conclusion-1

1. Japan is experiencing the periodic difficulties physically, environmentally, economically and socially due to the frequent natural disasters mainly of earthquakes.

2. Accordingly, short-, mid- and long term effective relief measures should be taken to cope with them, as well as the relevant preparedness measures for very possible future disasters.

Conclusion-2

3. In this regard, a cyclical design process for the human security must be taken into consideration as the top priority involving all the stakeholders.

4. To this end, our collective efforts through communal and local solidarity beyond disasters will be the very base towards;

Resiliently Sustainable Housing for Human Security.



Thanks for your attention.

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