A CONCEPT OF RESILIENT HOUSING
DA NANG, VIETNAM

RESILIENT HOUSING
DESIGN COMPETITION
2013

As part of the Sheltering from a Gathering Storm project, ISET-International, Hue College of Economics, Hue Planning Institute, and Da Nang University of Architecture organized the Resilient Housing Design Competition, with funding from the Climate Development Knowledge Network in Da Nang, Viet Nam. This competition was open to engineers, architects, students, teams, and individuals to show off their talent for designing low-cost housing that is resilient to climate change.

Here we share with you the winning design from team TT-Arch, and describe how they capture characteristics of resilience in their thoughtful and beautiful design.

The competition rules required each design to include two or three rooms, a kitchen, and a toilet; construction costs under $10,000 USD; consider climate resilience, environmental sustainability, and the sourcing of local materials and labor; integrate innovative construction technology that meets building codes and bylaws; and make all design considerations for low-income households.

Sheltering From a Gathering Storm

Sheltering From a Gathering Storm aims to improve the understanding of the costs and benefits of climate-resilient shelter design, and contribute to the transformative change necessary to make communities more resilient to future disasters.

Shelter design is one of the largest factors influencing the loss of lives and assets during extreme climate events, and is therefore one of the biggest costs for governments, the private sector, and NGOs working on disaster risk reduction or post-disaster reconstruction. Using cost-benefit analysis, this applied research project produces a number of outputs to provide insights into economic and non-financial returns of adaptive, specifically resilient shelter designs that take into consideration hazards such as typhoons, flooding, and temperature increases. The research spans South and Southeast Asia with a focus on central Vietnam, northern India, and central to northern Pakistan.

This document is an output from a project funded by the UK Department for International Development (DFID) and the Netherlands Directorate-General for International Cooperation (DGIS) for the benefit of developing countries. However, the views expressed and information contained in it are not necessarily those of or endorsed by DFID, DGIS or the entities managing the delivery of the Climate and Development Knowledge Network, which can accept no responsibility or liability for such views, completeness or accuracy of the information or for any reliance placed on them.

ISET

www.i-s-e-t.org/**SHELTER**

CHARACTERISTICS OF RESILIENT SYSTEMS

The characteristics of resilience are drawn from the Climate Resilience Framework. A robust collection of materials, including training materials, further elaborate on this conceptual framework and are available at **www.i-s-e-t.org/crf**

1 SAFE FAILURE

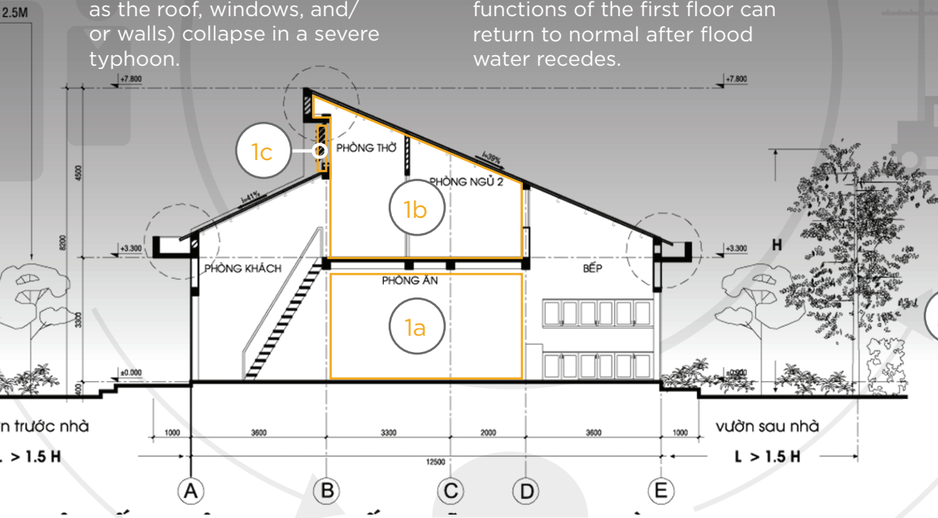
The ability to absorb shocks (both sudden and/or cumulative) in ways that avoid catastrophic failure. Safe failure also refers to the interdependence of various systems that support each other; failures in one system can be compensated in another, thus avoiding cascading impacts across other systems (Little, 2002).

1a A living room and a toilet are designed with a reinforced concrete frame combined with reinforced concrete slab, forming a safe box for occupants to shelter in case of a severe typhoon. This place can protect occupants even if other parts of the house (such as the roof, windows, and/or walls) collapse in a severe typhoon.

1b A bedroom and worship room are located on the second floor and serve as places for occupants if the first floor is flooded.

1c An escapee area was designed in case flood water rises to the second floor. Occupants can use this area to escape in order to access emergency rescuers or to move to a safer place, such as a public shelter.

1d Materials on the first floor are designed with water resistance in mind. For example, a reinforced concrete frame and bricks are used, and electrical wires are hung high so that the functions of the first floor can return to normal after flood water recedes.



2 REDUNDANCY AND MODULARITY

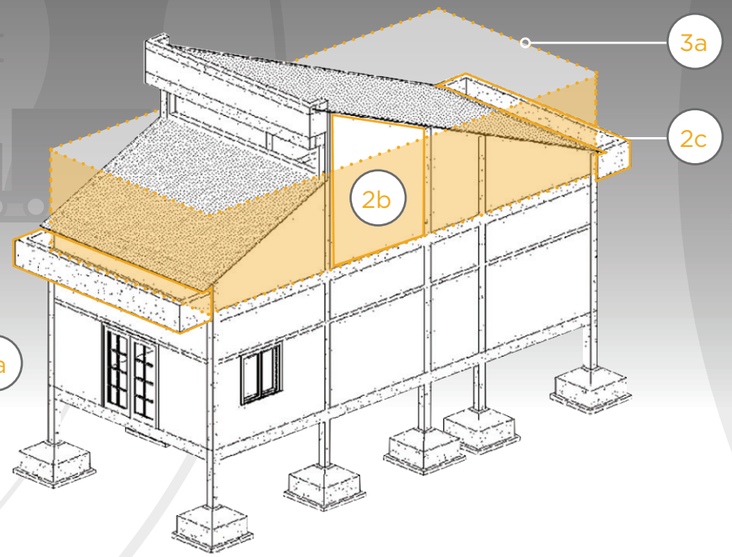
Interacting components are composed of similar parts that can replace each other if one, or even many, fail. Redundancy is supported by the presence of buffer stocks within systems that can compensate if functions in one area of the system are disrupted.

2a The main structure of resilient housing is designed stronger than that of traditional housing. All building parts are securely connected, for example ring beams, concrete slab and columns form a solid structure.

2b Simple rectangular building forms with the pitch roofs 30–45° enable local builders to build the house.

2c Overhang designed by reinforced concrete can effectively reduce the impacts of wind force that often cause damage to roof structure.

2d Reinforced connection between the reinforced concrete columns and brick walls by still bars.



3 FLEXIBILITY AND DIVERSITY

A resilient system has key assets and functions physically distributed so that they are not all affected by a given event at one time (spatial diversity), and has multiple ways of meeting a given need (functional diversity).

3a The house can be expanded vertically to have more rooms if the need arises.

3b Function of each room can be flexible; for example, the worship room on the second floor can be used as a flood shelter and the bed room on the second floor can be used as storage during flood season to reduce the property damage.

3c The design adapts to the local tropical climate conditions; it employees better ventilation and light during the day-time.

3d All material for the house are locally available and technical designs are simple to apply.

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