Introduction

During earthquakes, hurricanes, tornadoes or storms, these natural forces can impact your house in four ways: uplifting, racking, sliding and overturning.

In the last few years we saw these natural disasters affect millions of people's lives by destroying or damaging their homes.

During these natural phenomena, what impressed me are the strong, healthy trees: They always are survivors. My questions are: Why? How? What makes them survivors? In my view their strong deep roots, strong elastic trunk and elastic connections between the trunk and the branches make them survivors. How long a tree has these characteristics intact, he never fails.

Inspired by nature, I imagined new homes that stand up to earthquakes and hurricanes to protect us. My project Affordable Green House does that: Converting light by solar panels and the wind by wind turbines to make electricity, I compare my project with a tree. The tree cleans up the air from carbon dioxide. Because two houses are making pollution like one SUV, by my solution we have possibility to work with nature, not against nature. Our houses will be and will work like a tree. They will not emit carbon dioxide because everything inside will be powered electrically: furnace, appliances, etc. and this means to "go green".

In October, 2011 the Earth had 7 billion people. These people have to have houses. How long our houses will not be in harmony with nature, we will destroy the nature. And more and more stronger hurricanes and tornadoes will kill us. To make a unity between the "roots", foundation and the "branches", girders, I introduce elastic connections between steel tube columns and horizontal girders. You can see this structure on page 8, sheet 6 of 14.

In my project, I imagined a strong connection between "roots and the last branches", between foundation and the last roofing beam. To use elastic connection in our house's structure, we have everything. What is missing is the L support bracket that you can see in Connection Detail Illustration SK-1.

Using elastic connections and Simpson connectors between steel tube columns, horizontal girders, roofing beams and framing, Affordable Green House presented in Study 1, Study 3 and Study 4 is designed to stand up to hurricanes, tornadoes and earthquakes.

My elastic connection is simple to build, cheap in price and has high efficiency effect. Our houses are designed to support solar panels and wind turbines to make 50,000--150,000 kilowatts per year. In our days, we have strong electric batteries. It is possible to use these batteries in my project having double electric circuits: 120V and 24V. When the energy system collapses temporarily (due to snow, wind, rain, etc.), my house will have 24V used to power the lights, TV, radio and refrigerator. My solution, elastic connection, is simple and easy to integrate in Affordable Green House because Affordable Green House project was designed to use this connection. My solution is simple because it copies nature: "The Second Book of God".

With respect,

Gheorghe Bundas

This connection is designed on pages 3-7, sheets 1-5, SK-1.

Parts:

1) One (1) steel tube column

2) Three (3) L 1-1/2" x 4" x 3/16" steel support brackets 3" wide

3) One (1) 1-1/2" diameter x 4-1/2" long connector bolt with two (2) washers and one (1) nut

4) Girder

Construction:

1) Steel tube column

In SK-1 I present one steel tube column 4" x 4". Quality in this steel will be selected in each project based on engineering calculations.

2) L 1-1/2" x 4" x 3/16" steel support bracket 3" wide

L support brackets are built of steel 3/16" to 1-1/4" thickness. Quality in this steel will be selected based on engineering calculations for each project.

Each L bracket has a 1-1/2" diameter bolt hole and [2] 1/8" diameter technologic holes. The technologic holes are made to install the girder safely.

These three L brackets are connected by welding them to the steel tube column as presented in SK-1, page 3, sheet 1 of 14. By my estimate, it is possible to make one L bracket for approximately $7.00.

3) Bolt

The bolt dimension and steel quality is selected based on engineering calculations for each application.

4) Girder

The girder is built using 2" x 12" beams and 1/2" thick plywood. They are connected together using 3" nails or screws. The bolt hole in the girder in SK-1 is 1-1/4" diameter and is placed at 2-1/2" from the steel tube column. The girder will be splayed having 1" space between the column and the girder corners as shown in SK-1.

The girder dimensions and materials will be selected based on engineering calculations for each application.

Function:

The girder stays free on the bottom L support bracket (no bolts, screws or nails).

When the column is moving up and down, the girder has possiblity to rotate around the bolt. Because the bottom support bracket is elastic, it will receive the girder's effort elastically.

When the column is moving left and right (horizontally), the bolts keep the girder connected to the steel tube column.

With this connection the classic rigid connection between the girder and column is replaced with an elastic connection that eliminates the possibility to break the girder in connection.

Because the framing is elastic, with the elastic connections the whole building will move elastically and will not break or collapse during an earthquake, tornado or hurricane. Using steel columns and elastic connections in the building's structure, it is possible to keep the building safe against uplifting, racking, sliding and overturning.