Misconceptions About Geodesic Domes!

Many claims about geodesic domes have been made by people who have never built one or have simply regurgitated what they have read. If you're thinking of buying a dome home kit or building a dome from scratch read on, it's not any worse than conventional home building!

Material waste
Every building generates waste during construction and it is a matter of contention as to how much waste is being generated. You could compare the difference in amount of waste generated by the construction of a Mac Mansion and that of a Geodesic Dome and the waste for a Dome will be less substantial.

Admittedly, the amount of wastage claimed is fairly high but derives mainly from the plywood cladding/bracing. This wastage will be less if more than one dome kit is being manufactured since a lot of the "wastage" can be utilised in the 2nd, 3rd etc. dome kit being manufactured.

As far as the framing is concerned the wastage is really minimal since some of the framing components are as short as 300mm and can be made from the "Waste".

Doors and Windows
In a 5/8th dome installing windows and doors is not a problem since the triangles below the 3/8th level will accept standard doors and windows except in the smallest of domes (24ft)

Above the 3/8th level skylights are essential, nothing else will do and conventionally square or rectangular skylights are feasible. Of course, it is a matter of visual appeal whether one should prefer triangular skylights at a higher cost.

There are no different structural requirements (in terms of structural integrity) in a dome window/door installation than in a conventional square box.
The underlying principle is quite simple: "take out some structural components and you have to compensate this loss by alternate means, i.e. reinforce the resulting opening in a professional manner".

Check it out here:

http://www.bobvila.com/search?utf8=%E2%9C%93&q=skylights

Just look at the installation of a roof window/skylight in a standard roof across 2 rafters and take note of the structural compensation.

The most common mistakes made are in regard to the correct flashing of all openings and adjoined extensions. Keep in mind that water will always flow **DOWN**, even in Australia. The ignorance and indifference concerning flashing know how is simply phenomenal.

If you try hard you can even make a corrugated iron roof leak and here is how:
Always "nail" in the valleys, never on the ridges.
Go under this roof during the next downpour and you can have a shower.

When a Dome is not a Dome
Adding extensions to a dome (at ground level) isn't such a big problem and if done correctly does not reduce its strength, quite to the contrary it adds to its lateral strength by bracing the overall structure.

If in doubt try to investigate the reason for and use of flying buttresses in ancient domed/vaulted buildings such as Cathedrals. Yes, there are structural sections of the dome structure one should not interfere with. To get into these details is a little too involved.

Planning permission - This can be a real problem!
There are some local building authorities with a very open mind only concerned with building code compliance and there are authorities who have set themselves up as the taste police and will not permit anything else but Mac Mansions in their fiefdom.

You can fight this by trawling their bylaws very thoroughly and find the loopholes. All laws are designed to have loopholes to be found by the persevering.

Property value
Gain or no gain in property value is always a bit of a guessing game.

You will always find a buyer for what you have to sell. Sometimes it can just take a little longer and that applies to Mac Mansions as well.

In the current climate of high cost energy, and the pain inflicted on one's hip pocket nerve, a more energy efficient dome may look quite good to a larger number of potential buyers.

As always, it's the real estate agent handling the sale who, usually, just doesn't have a clue on how to pitch anything else than a square box.
I mean "can you actually live, or is it legal, in such a building?"

Good building practice
Of course it is a must with any building and ignore it at your peril.
A badly designed or constructed dome will not perform any better than any other poorly constructed building, so do your homework and get professional help if you need it. A well designed and constructed dome will be cheap to run, environmentally sound, beautiful, super strong and a joy to live in.

Humidity:
There are, generally, 2 types of buildings
1. Commercial
2. Residential

Both types of buildings have different times of occupation to be considered.

Commercial Buildings are usually occupied during daytime
Residential Buildings are usually occupied during nighttime.
Generally, night times are cooler than day times and that is where humidity can cause some real problems if not taken into account.

The average person will evaporate some 1.5-2ltrs of water per night, add cooking and showering, and when it is cold outside you will encounter condensation if you have not considered vapour barriers and venting during construction.

The necessity and specifications of vapour barriers are subject to local climatic conditions and your local building authorities will have these specifications for you to comply with for a very good reason.

These considerations apply to all buildings, but more though to residential buildings. In commercial buildings the very frequent opening and closing of doors will allow for a lot of venting and due to the lower thermal difference between outdoor and indoor during daytime condensation potential is substantially lower.

Furniture and Installations: There are no “curves” in a geodesic dome, only “sides”. There are basically 15 sides on a geodesic dome with 5 pairs of sides of equal length and 5 single sides of shorter length between a pair of longer sides. When you add 2 entrances at the 1st floor you end up with 3 pairs of longer sides and 5 shorter sides and 2 somewhat longer sides where the entrances are. All up 11 sides.
Even on a 24ft dome the shortest side is over 5ft long and in a 45ft dome the shortest side is just under 10ft long. Can you put furniture along these sides? You bet you can.

The Myth of Bigger Domes!

“Domes get stronger as they get bigger”

In all my research I have not been able find any substance to this widespread misconception. The responses to this assumption, received from various Structural Engineers, are not printable.

And here is simply why:

Most structures have joints (the structural variety).
These joints have a fixed value referred to as Joint Strength.
A joint is where structural components are connected.

As one increases the size of a building and uses the same joint with the same Joint Strength one increases the load on the joint. This, in turn, will reduce the strength of the structure. One would think this sounds really quite logical.

Add the occasional snow-load as well the occasional wind-load, which will logically also be bigger on a bigger dome, and you will find out soon enough.

This is particularly pertinent to geodesic domes whose weakest point is at the horizontal level between the 5/8th and 3/8th of the structure, where all the horizontal struts/members are under pure tension with no compensating compression.

Yes, Buckminster Fuller has built very large geodesic domes. They were all built in steel or aluminium and welded at their Joints. A properly welded connection is usually stronger than the metal used for the structure.

About the author:
Klaus Zimmer
I have designed, manufactured, exported and supervised the construction of geodesic domes and other types of DIY timber framed and plywood braced construction kits into a number of countries during the last 20 years.
I am also a qualified engineer with decades of extensive experience in various engineering disciplines and no longer young enough to know everything.

http://kwickset.net