Why Domes?

Oregon Dome Information Series #Ø

In the early 50's the fertile imagination and driving curiosity of one man led him to search for a housing concept that would successfully answer the coming realities of a changing world. Even then, this man — an eminent architect, engineer and environmentalist — was aware of the future changes that were to be wrought in our lives.

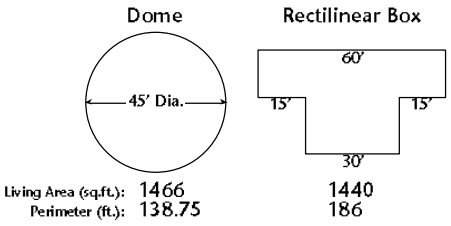
His goal was to develop a system for building homes that would *"work for 100% of humanity in the shortest possible time through spontaneous cooperation without ecological offense or disadvantage to anyone."* This man was R. Buckminster Fuller.

Beginning with the triangle — the strongest, most durable configuration known — he embarked on a journey that took him through years of study and experimentation.

The culmination of Fuller's efforts was the creation of a panelized, spherical building composed of a series of triangles: the geodesic dome.

Even though other very creative architects, some in Germany, had been working on developing geodesics, Fuller became the first person to effectively capture the power of the circle and the strength of panelized triangles that could be made in a factory and shipped to the building site for quick and easy assembly.

This new structure used fewer materials in its construction and was simpler, faster and far more economical to build than comparably sized rectilinear houses. It also had greater structural integrity than any other type of dwelling.



Domes provide **more** living area **with less** materials: the more compact footprint of the dome saves perimeter shell and foundation materials and significantly reduces heat transference.

Years have passed since Fuller created the geodesic dome and, as he predicted, they are finally coming into their own. Growing concern for the environment and the need to conserve energy are generating renewed interest in the geodesic dome homes.

Advanced Building Concept

A rectangle is inherently weak. Nail four pieces of lumber together in the shape of a rectangle, like that used in conventional home construction, and apply pressure to any given point. You'll notice that it will be fairly easy to collapse the rectangle.

Now use only three pieces of lumber to make a triangle — the rigidity and strength are quite remarkable. Applying pressure anywhere on the triangle can't change the shape.

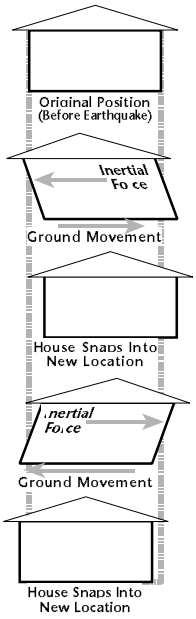
Nature uses the strength and efficiency of the sphere for the basic elements of life, from the simplest raindrop, which uses the shape of least resistance to fall to earth, to the sun which supplies heat and light to the earth itself. The strongest most destructive winds also come in circular form.

It seems only natural that we should live in a home shaped like a sphere. After all, what did nature create in a square?

In A Nutshell...

- **Framed and Sheathed Panels for a Complete Exterior**
- **Finest Materials, Close to the Source**
- **Quality Craftsmanship, Attention to Details**
- **Building System Support Throughout Project**
- **Models Are Available to Suit Many Situations**

Just how much stronger?



In 1989 the Loma Prieta earthquake (7.1 on the Richter scale) destroyed more than 500 homes in the Santa Cruz Mountains. Conventional homes, built using the most up-to-date methods, were suddenly nothing more than a pile of broken lumber. Of the hundreds of dome homes in the area, none were significantly damaged.

In 1992 another powerful 7.4 earthquake hit the Yucca Valley area of Southern California. Dome homes located only 12,000 feet (3.6 km) from the epicenter and only 600 feet (182m) from the fault line had little or no damage. The conventional homes around them were completely destroyed. The natural strength of the domes was demonstrated in a way that could never be duplicated on an engineer's drawing board.

Will the house you're thinking of buying, or are now in, survive a 7.4 earthquake?

I'll huff, and I'll puff, and...

In 1992 two *Category 4* hurricanes, Andrew and Inikki, caused incredible devastation in very populated areas of South Florida and on the island of Kauai in Hawaii. Winds of over 200 miles per hour (321 km), as well as tornadoes, swept through highly populated areas destroying everything in their path.

Or *almost* everything. While thousands of homes were destroyed, the dome homes in these areas simply stood there and took the full force of the storms.

One dome home was subjected to 212 mile per hour winds *and* a tornado at the same time and only lost its doors and windows. The box houses in the area were reduced to their foundations. Two other domes in Louisiana had damage to skylights caused by pieces of disintegrating box houses in the area.

Vast amounts of lumber were needed to rebuild the thousands of homes destroyed in these natural disasters. Dome homes only have to be built once.

Freedom of Design

The geodesic dome is a free-standing structure — there are no interior load bearing walls except those needed to support the second floor. With conventional box houses the walls have to be built and the roof trusses installed and sheathed before it can be roofed. With a geodesic home, the dome shell is raised in a weekend, and roofing can begin immediately.

Five natural openings for windows and doors capture the most complete views. You can add on to the openings with extensions, panorama view rooms, or connections to other buildings. Use dormers for second floor windows, or use skylights to let in lots of light. A cupola can be placed on top of the dome for increased ventilation and indirect lighting.

Lower levels have been used to economically increase living space or for a garage and large work shop.

Environmentally/Energy Efficient

The sphere is nature's most *efficient* shape, covering the most living area with the least amount of surface area.

When compared with a similar sized rectangularly-shaped house the dome home will have 30% less surface area. A dome home will actually use about 1/3 less lumber to build than a similar sized box house.

If every home were to be built as efficiently as the average dome home we could save millions of acres of forest.

Even though the dome uses less materials it is about *five times stronger* than a rectangular-shaped house. And a third less surface area means a third less heat is transferred to and from its surroundings.

The reduced heat transfer of a typical dome home translates into reduced energy use. With an average energy savings of over 30%, the need for more oil, gas, and electricity generating plants could be reduced.

Titles in the Oregon Dome Information Series

1 Getting Land
2 Planning
3 Cost Analysis
4 Builders
5 Lenders
6 Materials
7 Plan Differences
8 Energy Advantage
9 Indoor Ambiance
10 Engineered Wood
11 Disaster Fitness
12 ODI Products
13 Smaller Geodesics
14 Larger Geodesics

To order a title in the series, contact:

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OREGON DOME Answers

- **Why should I consider a dome for a home of my own?**

An Oregon Dome home is *resource efficient* in its use of both energy and material resources. Less building materials means less cost for comparable quality.

With opportunities for vaulted ceilings and skylights, an Oregon Dome also allows for more aesthetic enjoyment of space. Its arched walls and ceilings direct and reflect light and sound along faceted surfaces, creating interior environments in which both its human and plant inhabitants can thrive.

- **Where can a dome be built?**

Because Oregon dome homes meet all requirements of all state building codes and energy codes, they may be built in any state. Oregon Domes have been built on city lots and country estates, on expansive view sites on the coast and secluded camps in the mountains. The exterior color and texture of roofing and siding, and the details of trim on domes may be designed to either blend into, or stand out in, nearly any surroundings. Rare deed restrictions consistently applied may specify only one building style in a development.

- **Is conventional financing available for dome construction?**

Since 1975, Oregon Dome homes have been financed by banks, savings and loan associations, commercial banks, and state and federal programs. Domes have earned a good reputation among knowledgeable lenders. If you are unsure that your lender understands the advantages of mortgage investments in domes, please contact us to ask for assistance and to order the *Lenders* issue of Oregon Dome's *Information Series*.

- **What floor plans are available for domes?**

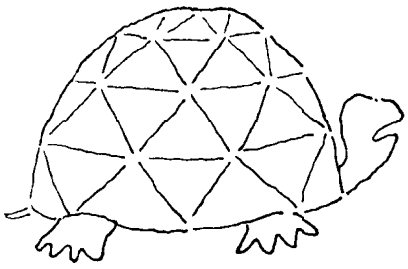
Because the dome shell is structurally independent of interior framing, it requires no interior support walls, which allows for great flexibility in designs. We have hundreds of stock floor plans to choose from for homes, cabins, garages, commercial buildings and churches. You may also modify one of our stock plans or design an original, custom plan from your own ideas and sketches. We provide firm bids in advance, without charge, for preparing new and modified plans.

More information on plans can be found in the *Planning* issue of Oregon Dome's *Information Series*.

- **What does it cost to build a dome?**

Depending on the size, complexity and quality of finish, Oregon domes can be completed by a contractor for $10 less per square foot than conventional construction of equal quality. Owner participation can reduce this cost, just as your decisions on design and finish quality can increase the cost. While the choices are ultimately yours, we can help you estimate in advance, usually within plus or minus five percent, the cost to build the plan that best suits your needs.

More information can be found in the *Costs* issue of Oregon Dome's *Information Series*.



"So along comes this guy named Buckminster Fuller and he tells me that he can design for me a better shell!"

Answers (continued)

- **How much snow and wind can a dome withstand?**

Oregon Domes can withstand the elements far better than any other structural shape because geodesic domes combine the inherent strength of triangles and the aerodynamics of the sphere. Just as wind passes over a dome, so does outside noise. Our structures are engineered for winds up to 110 mph, and snow loads of 200 lbs. Engineering is available for areas with higher winds or heavier snow loads.

More information can be found in the *Disaster Fitness* issue of Oregon Dome's Information Series.

- **What kinds of foundations are used for domes?**

Any of several conventional foundations may be used, depending on the dome design and site requirements. The most common options are:

- a lower level made of
  - permanent wood
  - poured concrete
  - concrete block (CMU)
  - concrete in insulating forms
- monolithic or floating slab, optionally with PWF slab insulation
- perimeter wall of PWF, concrete, CMU or insulating forms for concrete, with crawl space under wood joists and subflooring

More information about foundations is in the *Materials* issue of Oregon Dome's Information Series.

- **Are leaks a problem in dome roofs?**

A dome, like any other structure, should not leak if a good quality roofing material has been properly installed by a professional roofing contractor or a competent owner-builder. When domes first became popular they developed a reputation for leaking, largely because inferior roofing materials and methods were used by experimenters and inexperienced builders.

Proper installation methods and recommended materials for roofs and other phases of construction are explained in the *Guide to Construction Management* published and distributed by Oregon Dome.

- **Will I need to find a contractor who specializes in domes?**

Any qualified builder with experience in building custom homes should be capable of finishing an Oregon Dome. However, builders unfamiliar with domes often raise concerns about the difficulties of installing roofing and drywall. These procedures are explained in full detail in the construction manual described above. Methods of cutting drywall are also described in the working drawings provided for your dome. As an option, we also offer drywall precut in triangular sections at the factory to fit your dome.

For more information read the *Builders* issue of Oregon Dome's Information Series.

- **What makes Oregon Dome's plans and kits so special?**

We support your vision, budget and builder with stock, modified and custom plans that win building department approval in any state. See the *Plan Differences* issue of Oregon Dome's Information Series.

We supply an integrated kit for constructing a fully sheathed complete exterior shell — it *is* the form of your building. And you'll pay less for the wooden panels, even after considering freight, because they're made close to the source of the raw material.

We provide information to your lender from our database of completed and resold domes. The loan appraiser needs this data to establish that a viable market exists so the mortgage can be successfully sold on the secondary money market.

We value your interest and participation, respect your desires for space at the budget you designate, and assist you in every phase of your project, through completion.