



Volume 8 / Issue 4

## DOUBLE TROUBLE

Florida poses a dual threat for pool shell heave, or “pop”. The first issue is the heavy rainfall from storms that rapidly soak the near surface soils, which in turn, quickly raises the groundwater level. The second issue involves many low lying areas with shallow water tables! When these two situations combine, even half empty pools do not stand a chance!



*Heaved pool shell and slab*

## CONCRETE FLOATS ???

The vertical displacement of a pool shell, of any construction type, is an interesting, but costly, failure that can occur to any property owner. Hydrostatic pressure, or water pushing upwards, is the reason why pools can heave, or “pop” up, out of the ground.

All ships or boats float because the weight of the water they displace is equal to the weight of the boat (Archimedes' principle). Think of an empty pool shell as similar to that of a boat hull. However, many boats are made of materials that are denser than water, meaning that the boat would sink if filled with water. This is the same for pool shells.

Practically, the Archimedes principle allows the buoyancy of an object, partially or wholly immersed in a liquid, to be calculated. The downward force on the object is simply its weight. The upward, or buoyant, force on the object is that stated by Archimedes' principle. In simple words, Archimedes' principle states that when a body is partially or completely immersed in a fluid, it experiences an apparent loss in weight which is equal to the weight of the fluid displaced by the immersed part of the body.

To alleviate this problem, the majority of concrete pools are built with a hydrostatic relief valve. A hydrostatic relief valve prevents the pool from wanting to become a 'boat'. If the bottom of the pool is below the level of ground-water, and the pool is emptied, the valve would open and allow groundwater to flow into the pool.

### Questions about Hydrostatic Heave:

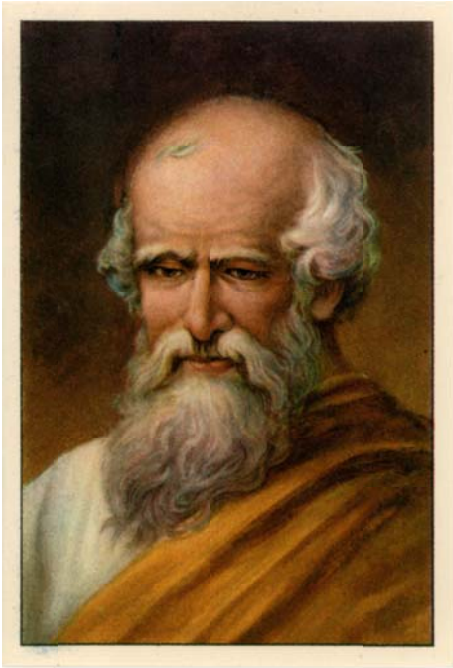
*Hydrostatic heave is a common occurrence in Florida. Our Structural Damage Assessment can objectively and independently record the event of a hydrostatic heave and is based on a limited visual, non-destructive evaluation of the site conditions.*

### **Q: Who performs a Hydrostatic Heave assessment?**

A: Mr. Renato Carotti, PE, licensed engineer with over fifteen years structural engineering experience, performs all structural damage assessments.

### **Q: Why do I need this report?**

A: This report provides you with specialized knowledge regarding your specific conditions, thus allowing you to make more informed decisions.



Archimedes circa 250 B.C.

**Q: I have your report, now what?**

A: This report can be a useful tool in real estate transactions, contractor negotiations, insurance company claims, and determining a course of action.

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*“Any object, wholly or partially immersed in a fluid, is buoyed up by a force equal to the weight of the fluid displaced by the object.”*

*– Archimedes of Syracuse*

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**SCOPE OF ASSESSMENT**

The scope of the assessment is limited to the structural elements in question. This is most likely the pool shell and surrounding deck, patio, or lanai. In some instances, pool cages and roof fascia/overhangs can also be damaged! It is the structural engineer’s task to determine the extent of damage, and the appropriate approach, or approaches, to repair the damage. This information is invaluable to the property owner when getting comparable quotes from repair contractors!!

***HEAVED POOL SHELL, AS VIEWED FROM UNDERNEATH***

