

## MID-RISE CONCRETE FLOORS – Preparation for Hard Flooring

People in the mid-rises (Bldgs. 1 & 2) have been asking about drilling holes in their floor slabs or grinding down the floor surface so floating hardwood floors will be at the same level as other floor areas. They get upset when they are told they can't do it under any circumstances. After all, those floors are concrete and concrete is very strong. What's the problem? Why can't we do simple things to our floors? Because any intrusion into the concrete floors can be disastrous – to our property and our lives. Here's why.

Concrete is a wonderful building material. It is simple to make, simple to install and incredibly strong. Or is it? There are several measures of strength. In compression (or squeeze), concrete is wonderfully strong, capable of over 3,000 pounds per square inch loading. So concrete is a great material for foundations and other weight-bearing structures.

The opposite of compression is tension (pull or stretch), and concrete is incredibly weak in tension. It can't hold anything up in tension.

Now think of a beam or slab which is supported at its ends. A load in the middle will try to bend it downwards. This will put a compression load (squeeze) on the top and a tension load (stretch) on the bottom. It will break and collapse. So we can't use ordinary concrete in such a design. Fortunately, architects and engineers have come up with ways to make concrete structures always work in compression.

The oldest method is called pre-stress, and puts cables under tension into the concrete form. When the concrete hardens, the cables put a tension load on the structure. This is how bridges, overpasses, beams and such are built. Even though there may be a large load on a bridge, which would force the bottom of the bridge to be in tension, there is enough pre-stress to keep everything in compression at all times.

A newer method is called post-tension. In this system, plastic-sheathed cables are laid across a concrete form. After the concrete has hardened (cured), tension is applied to the cables and the ends secured to the concrete. Thus the whole slab works in compression, even if there is a major load on it. This method works very well on large flat slabs. This is how our floors are built in buildings one and two

When you see a concrete building under construction, look at the edges of an unfinished floor. If you see cables sticking out, or a series of spots which are the cable terminations, you are looking at a post-tension floor. The big advantage of this design is that it saves several feet in the structure of each floor, allowing more floors for a given height. And in San Francisco, and other cities with height limits for most buildings, post-tension construction is very common,

In each of our mid-rise units, there are hundreds of cables running in both directions in our floor slabs. Without an x-ray machine, it is impossible to know exactly where each one is. (Note – the townhouses are constructed of wood and have different rules.)

What happens if a cable is broken? Not very much. There are enough extra cables to provide a safety factor in every floor. Both the building code and good engineering practice require a generous safety factor.

What happens if a lot of cables are broken? Disaster. The floor will fail into the floor below it. It might stop there or the weight of the two could cause the whole building to come down. Yes, the instant the weight of the floor exceeds the compression loading, the building might come down, killing many people.

This is why our Rules prohibit grinding or drilling of the floor slabs. If you break a few cables and your neighbor breaks a few more, we could have a major disaster. Recently, several contractors have tried drilling or grinding into the concrete flooring as part of remodeling projects. Fortunately, our manager has stopped them in time. But we can't expect our manager to be aware of what's happening in every unit all the time.

*It's up to each and every homeowner to make sure that no drilling or grinding of the floor is done. Failure could mean loss of lives and tens of millions of dollars in damages. Our Condominium Rules are very clear on this subject, and it is needed to protect all of us. If you suspect anyone – owner, tenant, or contractor – is drilling or grinding a mid-rise floor, please notify the Management Company immediately. It's a matter of saving our property and saving our lives.*

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