**From:** Ascunce, Sergio (RER) [mailto:Sergio.Ascunce@miamidade.gov]
**Sent:** Tuesday, April 12, 2022 8:47 AM
**To:** Madani, Mo
**Subject:** RE: HRAC Upcoming Meeting 4-14-2022

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Mo,

I have updated the research description to better indicate the research needed.  Can you please substitute the language below in place of what I originally sent.

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During this year’s legislative session there were several proposals for initial building recertification age of 20 and 25 years for coastal building.  There are communities requiring building recertification for coastal building at 30 years.  What is the right age of a coastal building for its initial inspection, scientifically?

Concrete carbonation causes embedded steel reinforcement to corrode, with the resulting expansion cracking and weakening of concrete known as spalling.  It is a reaction to concrete exposed to the elements, particularly the salt environment of coastal buildings, and can advance at a varying rate depending on the concrete’s porosity and permeability.  It is the result of an electrochemical reaction between carbon dioxide, moisture, and calcium hydroxide that is present in the cement.  As the initial pH level of concrete is reduced due to this reaction, carbonation sets in, and the protective layer gets destroyed leaving the steel vulnerable to corrosion.

The rate of carbonation depends on the following factors.

* Presence of pore water
* Grade of concrete
* Permeability of concrete
* Protected or unprotected concrete
* Depth of cover
* Time

This research can go a long way to scientifically determining the right age to start inspecting coastal concrete reinforced buildings in Florida.

I would recommend this research project be taken up by one of our research partners to assist in determining the following:

What is the scientifically best age of Florida’s coastal buildings where the initial building inspection should be performed?

Should the age for initial inspection of a building outside the coastal region be different?

What is the relative penetration of carbonation to concrete cover over time for the varying strengths of concrete?

Does the chloride environment of a coastal building accelerate the process of carbonation?

How does the grade of concrete prevent carbonation?

How is carbonation detected in an existing building?

How is carbonation prevented in an existing building?

How are the effects of carbonation treated?

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Thank you,

Sergio T. Ascunce, **Division Chief III / Deputy Building Official**

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