Public NRC Meeting

License Renewal for 100 years of Plant Operation, Technical Issues for Civil Structures and Concrete

A Researcher's Point of View

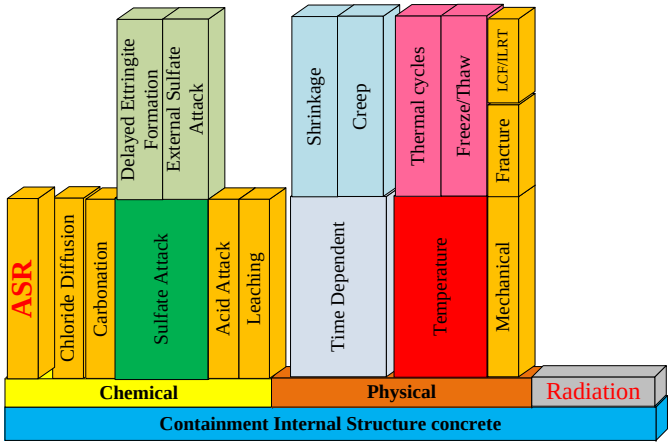
Victor E. Saouma
url; saouma@colorado.edu

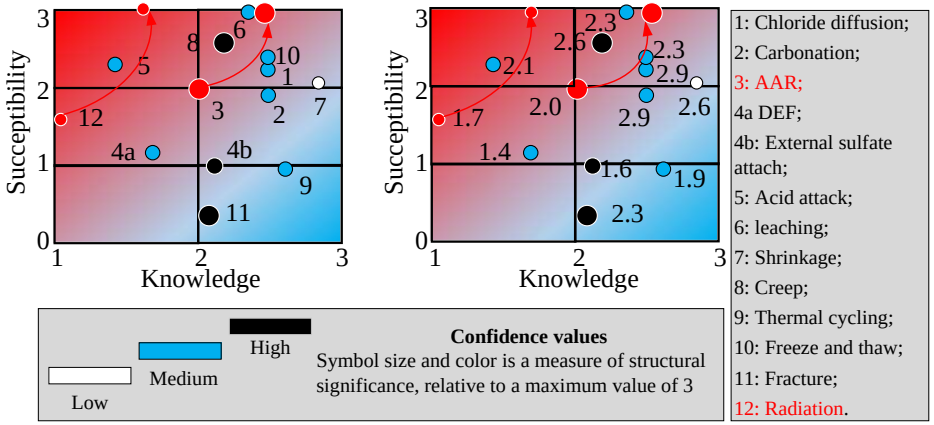
University of Colorado, Boulder
X-Elastica, LLC

Jan 21, 2021

Table of Contents

- My guess is that there will be a strong push from industry (and possibly from the NRC) for such an extension.
- Short answer: Yes. If the Pentagon has contingency plans to attack Canada, then the NRC should develop properly crafted contingency documents for a 100 years operation, as soon as possible.
- Note:
  - Keep in mind that there is a time lag between scientific knowledge and engineering codes.
  - To the best of my knowledge no other country is making such a bold move, not even for 80 years
  - Let us always keep in mind that those reactors were designed with 40+ year-old technology for 40 years (not 60, 80, let alone 100).
  - Since then much has been learned about aging, seismic, and safety. We can not ignore those developments.





- Technical issues have been addressed (for 80 years of operations) by *NUREG/CR-7153, Vol 4 Expanded Materials Degradation Assessment (EMDA) Volume 4: Aging of Concrete and Civil Structures (2014)*[1]
- Two sites have been affected (as far as I know) by ASR:
  - Seabrook: Containment building
  - North Anna: Transmission towers
- Biggest issues (2021) & both cause swelling
  - AAR Containment building
  - Radiation Reactor vessel

Within a 100 years operations, likely to be many more.

[1] I was a member of the panel

First, lessons learned from my personal involvement with Crystal River and Seabrook[2]

- NRC has not regulated, but commented on documents submitted by industry
- Minimal technical input from regulator
- Absence of well known NRC experts (such as Herman Graves, Dan Naus or Abdul Sheikh)
- No panel reviews
- What is the point in having knowledge (per previous slide) if it is not applied and we remain shackled by 40 years old design codes!
- Administrative/bureaucratic considerations prevailed over best possible (and reasonable/achievable) safety.

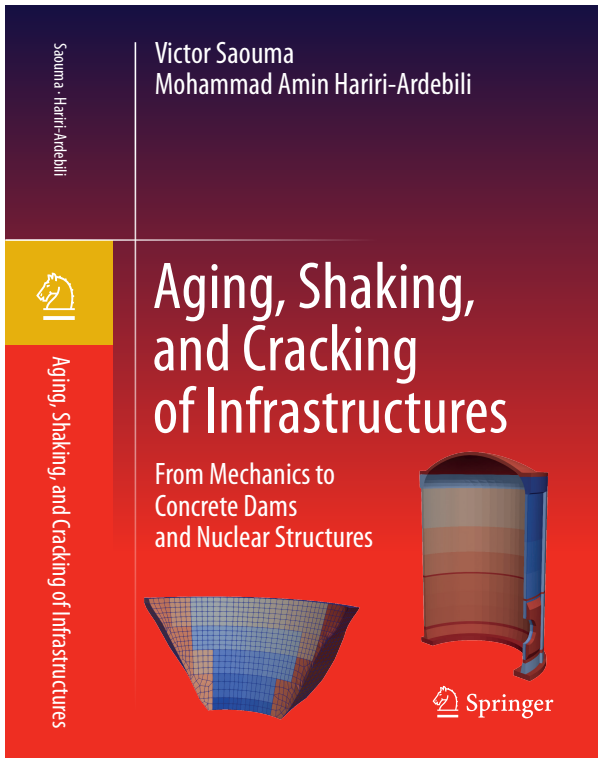
This paradigm should be avoided in its entirety. This is now an entirely new ball game

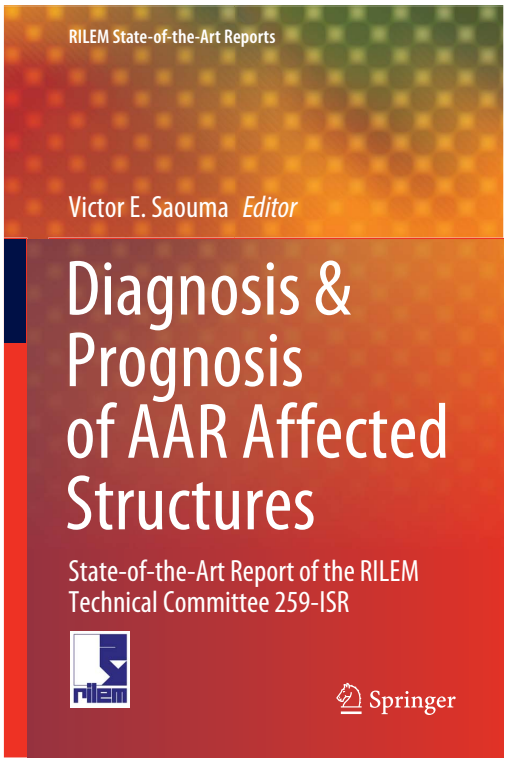
[2] This is relevant as it is indicative as to how the NRC seems to have has addressed technical challenges related to Beyond Design Basis

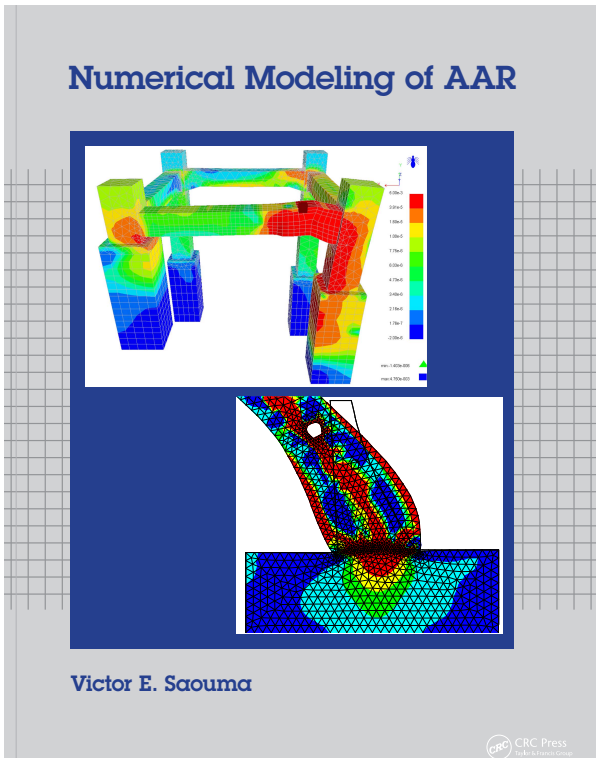
The NRC should:

1. Safety and not $$ utmost priority
2. Science first, Engineering second
3. Develop regulation itself and not subcontract task to industry or EPRI.
4. Convene panel of experts and revisit the 2014 EMDA.
5. Fund and adopt research (laboratory tests and simulation tools) when needed, and results should be implemented in regulations
6. Convene technical panels, perform peer reviews
7. **Forget original design codes** for operation or aging management, enforce compliance with most recent ones, and prioritize scientific knowledge over design codes
8. Tighten Aging Management Program
9. Should be a collaborative effort between Scientists, Engineers, Regulators, & Utility Companies.

and maintain its worldwide leadership in nuclear safety.







Victor E. Saouma