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# **Working in Nuclear Power Projects**

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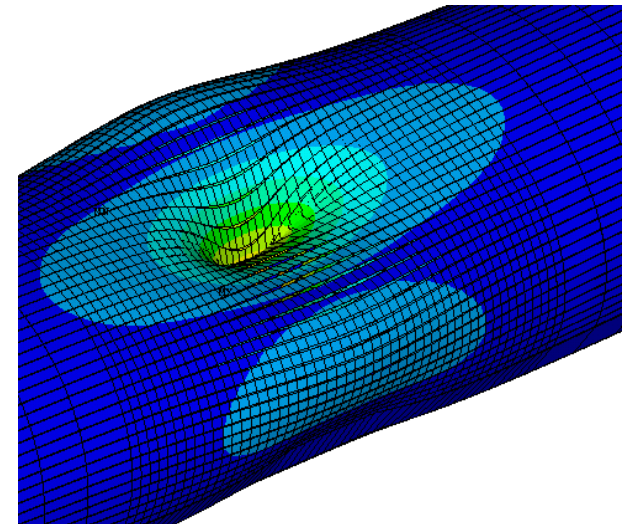
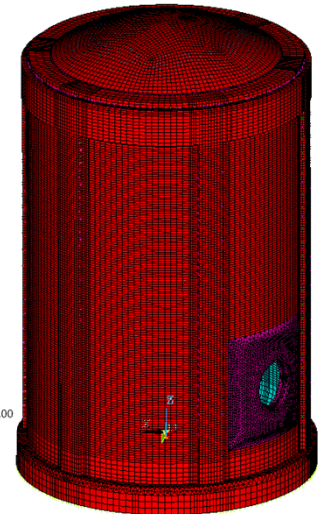
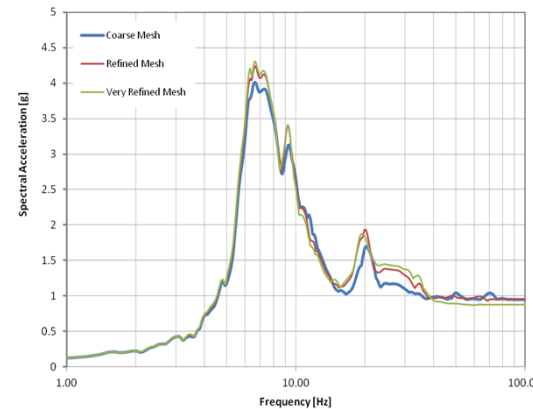


# Professional Background

## ■ Design / analysis in 15 Nuclear Power Plants

- Nuclear containment analysis
- Seismic evaluation
- Missile impact analysis

1. Palo Verde Nuclear Power Plant (USA)
2. San Onofre Nuclear Power Plant (USA)
3. Davis Besse Nuclear Power Plant (USA)
4. Turkey Point Nuclear Power Plant (USA)
5. Hatch Nuclear Point Plant (USA)
6. Calvert Cliff Nuclear Power Plant (USA)
7. Bellefonte Nuclear Power Plant (USA)
8. Crystal River Nuclear Power Plant (USA)
9. Maanshan Nuclear Power Plant (Taiwan, RC)
10. Vogtle Nuclear Power Plant (USA)
11. Farley Nuclear Power Plant (USA)
12. Wolfcreek Nuclear Power Plant (USA)
13. Generation mPower (USA)
14. Barakah Nuclear Power Plants (United Arab Emirates)
15. Columbia Nuclear Generation Station (USA)



# General Information

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- Worldwide
  - More than 400 Nuclear Power Plants (150)
  - 17% of total electricity power
- United States
  - 104 Nuclear Power Plants (88)
  - 20% of total electricity power
- China
  - 6 Nuclear Power Plants
  - 1% of total electricity power
- Industry Setback after Fukushima Catastrophic Event

# Advantage / Disadvantage

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- **High EPC Cost vs. Low Operating Cost**
  - ❖ Nuclear Power Plant:
    - High initial EPC cost ( **\$5 Billion** for a 1000MW NPP, NEI Financial Model, 2013)
    - Low operating cost / more profit ( **\$0.0024 / kWh**, NEI chart, 2012)
    - High financial risk for investment
  - ❖ Gas Combined Cycle Power Plant:
    - Low initial EPC cost ( **\$1 Billion** for a 1000MW CCP, NEI Financial Model, 2013)
    - High operating cost / less profit ( **\$0.0034 /kWh**, NEI chart, 2012)
- **Zero Global Warming Contribution vs. Radiation Risk**

# US Regulation, Code and Standard

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- **US Nuclear Regulatory Commission (USNRC)**
- **Codes and Standards for NPP (Civil /Structural)**
  - **ACI 349** (*committee member*, ACI 349B)
    - ❖ American Concrete Institute (ACI)
    - ❖ Concrete nuclear structures (except **Concrete Containment**)
  - **ASME BPV III** (*committee member*, WG Design Methodology)
    - ❖ American Society of Mechanical Engineers (ASME)
    - ❖ Construction of nuclear facility components (including **Steel Containment**)
  - **ACI 359 / ASME BPV III Div.2** (*committee member*, Main Committee)
    - ❖ ACI / ASME Joint committee
    - ❖ Nuclear **Concrete Containment**
  - **AISC N690**
    - ❖ American Institute of Steel Construction (AISC)
    - ❖ Steel structures in nuclear power plants (except **Steel Containment**)

# EPC Project: \$5~10 Billion

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- Engineering
  - Nuclear
  - Mechanical
  - Electrical
  - Civil / Structural
  - Geotechnical / Water
- Procurement
- Construction

# Working Environment: Industry

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- Companies
  - Small Firm vs. Large Corporation
- Projects
  - Small vs. Large
  - Commercial vs. Industry
- Required Skills
  - Broad vs. Specialized
  - Independent vs. Teamwork

# Working Environment: Engineering

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- Typical Project Organization

Engineer → Engineering Supervisor → Project Engineer → Project Manager → Project Director

- Typical Function Organization

Specialist /Staff Engineer → Chief Engineer → Engineering Manager  
→ Principle Engineer → Technology Manager

- Engineering Work

Originator → Checker → Engineering Supervisor → Specialist/ Staff Review



# Tips for Recognition

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- Raise and promotion of an engineer is determined by recognition he / she receives
- Key Person: direct manager who performed your review
- Think from the perspective of your direct manager
  - Benefit you can bring to him / her
  - Benefit for him / her to promote you
  - Avoid bypassing him /her in order to impress the higher level manager
  - Others

# Tips for Being Distinguish

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- Understand Your Strength and Weakness
- Find the Gap
- Take Initiative
- Seize Opportunities

**Thank You !  
Questions ?**

