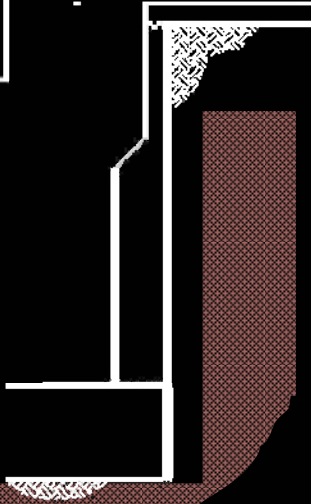
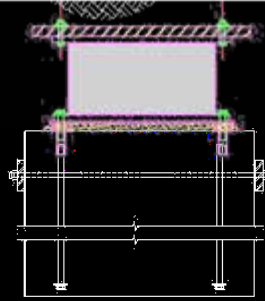
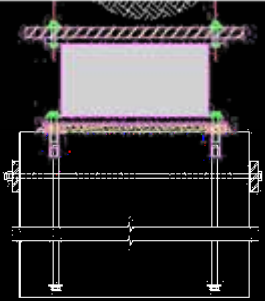
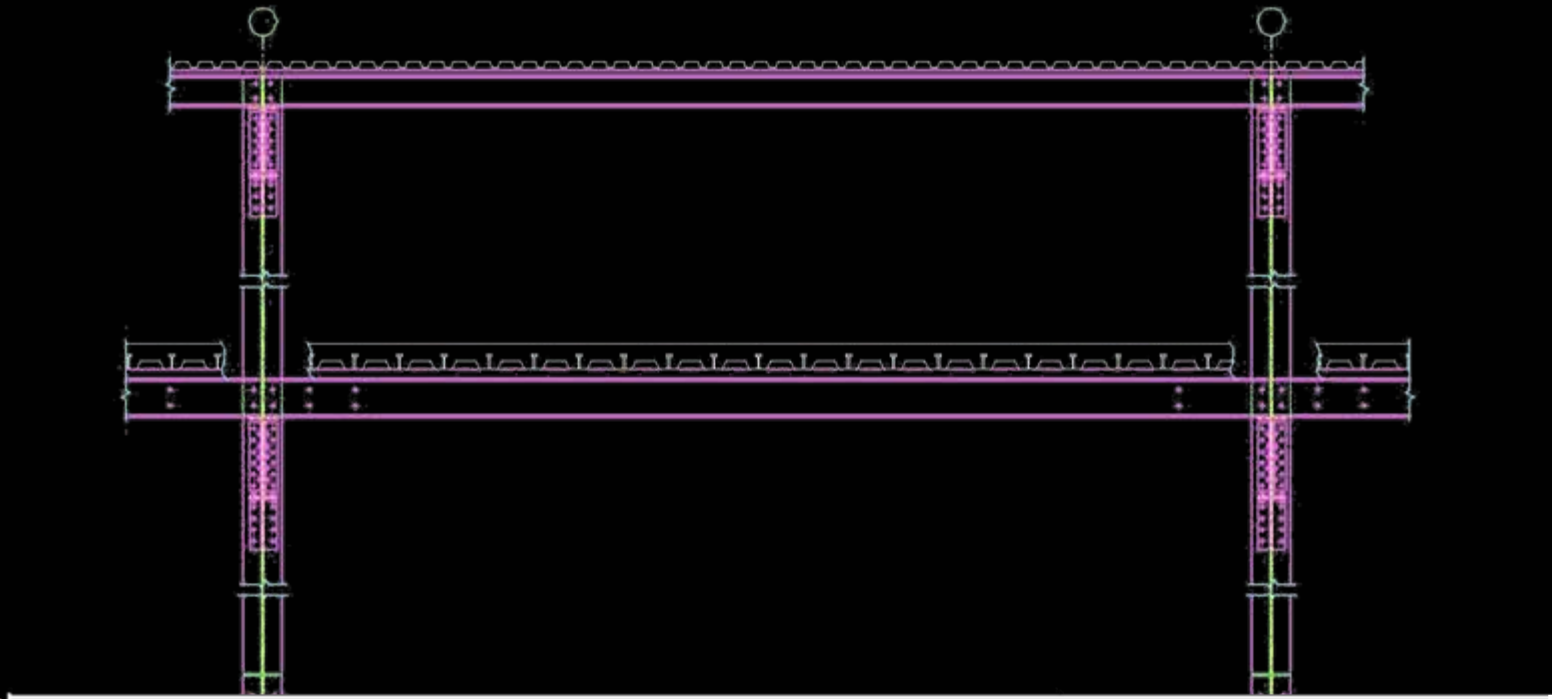




# Base Isolation in New Construction

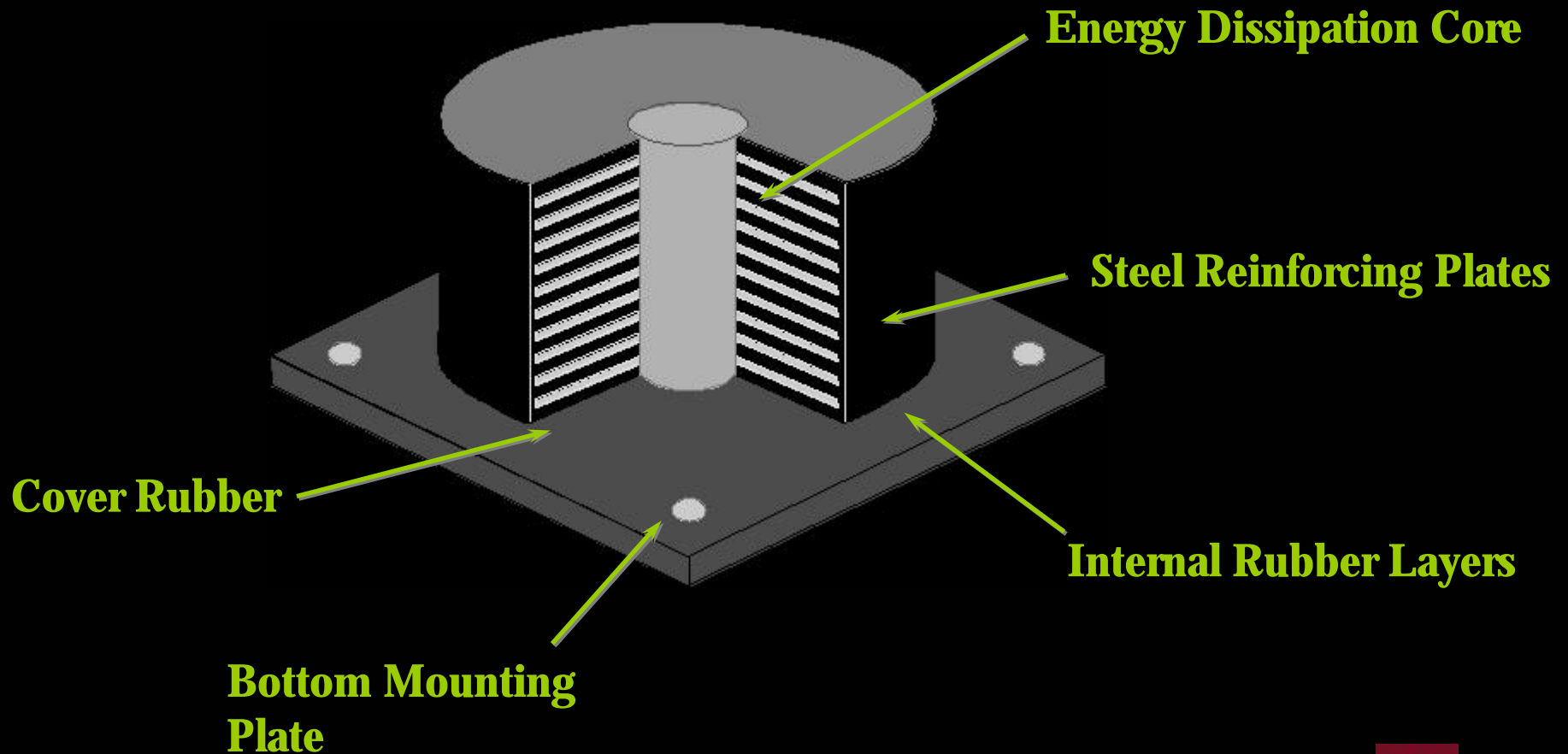
**Patrick Ryan**

RUTHERFORD & CHEKENE

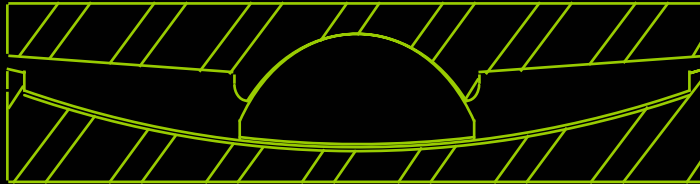


# Elastomeric Seismic Isolator

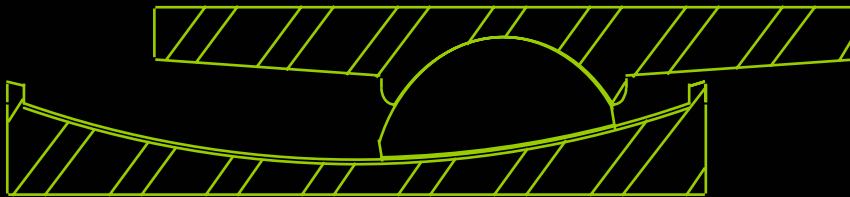
LRB or HDR



# Friction Pendulum Bearing



**Center position**

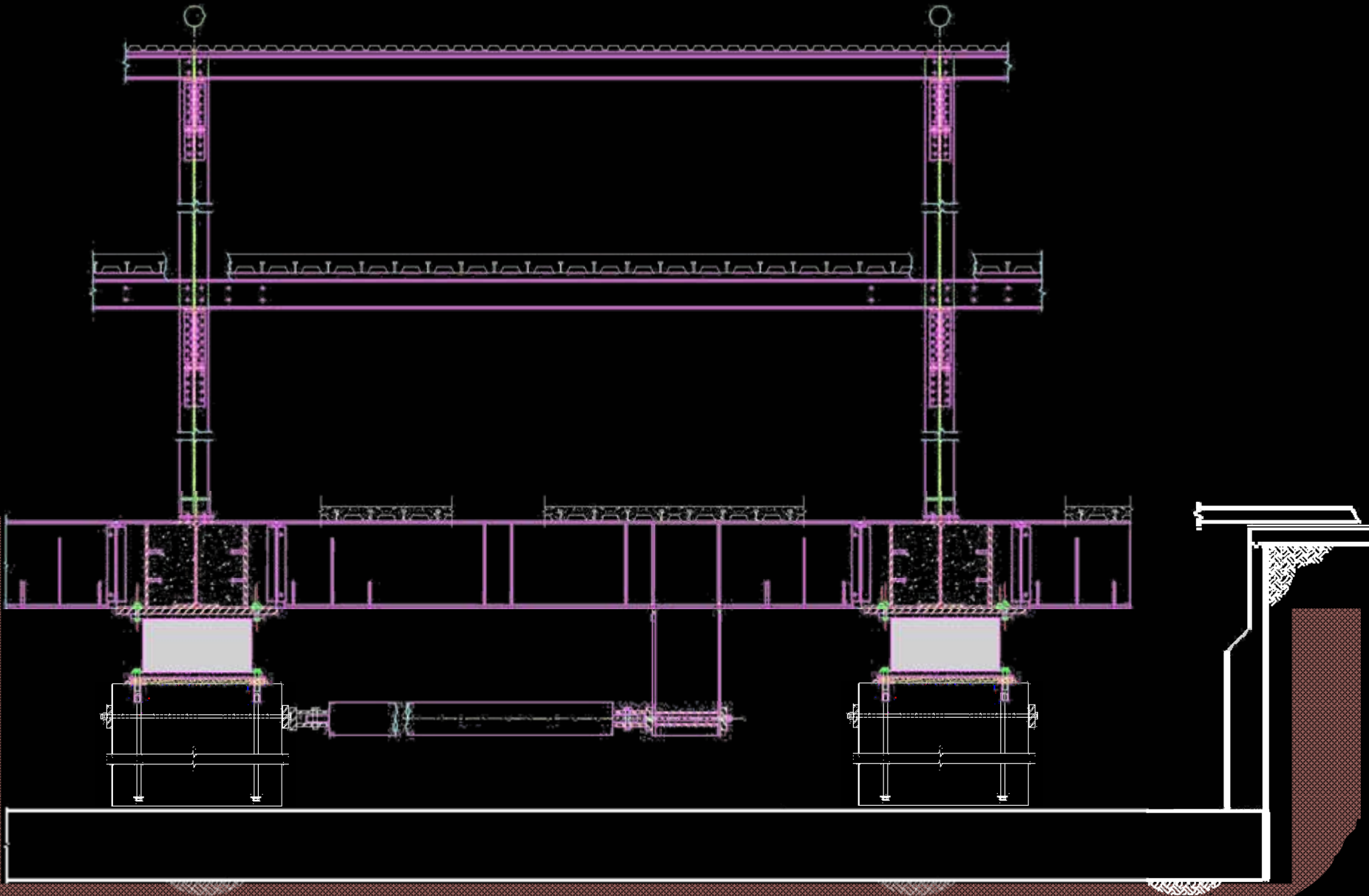


**Displaced position**



# Isolation Bearing Manufacturers

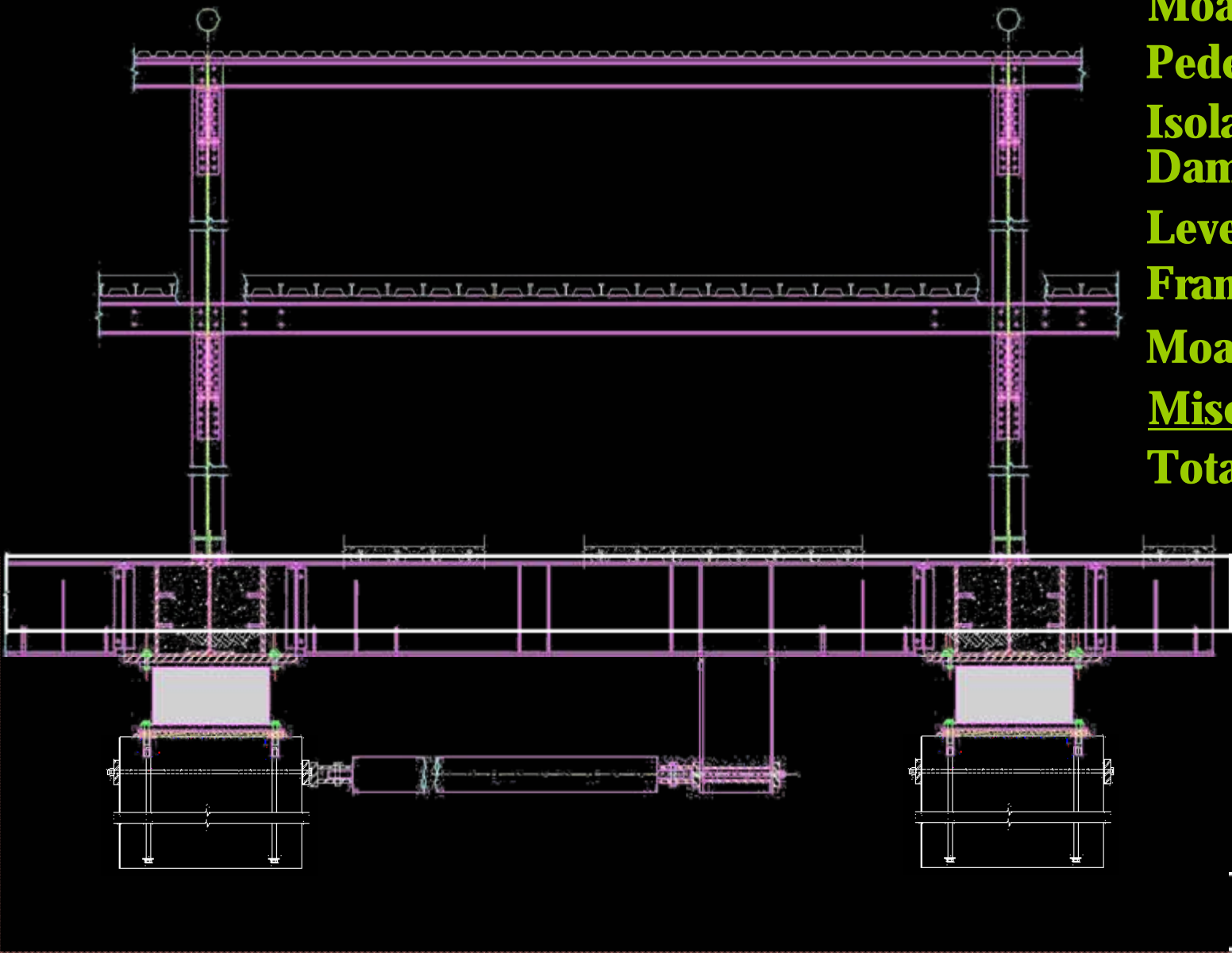
- DIS [www.dis-inc.com](http://www.dis-inc.com)
- Andre [www.silvertown.co.uk](http://www.silvertown.co.uk)
- Bridgestone [www.bridgestoneindustrial.com](http://www.bridgestoneindustrial.com)
- EPS [www.earthquakeprotection.com](http://www.earthquakeprotection.com)



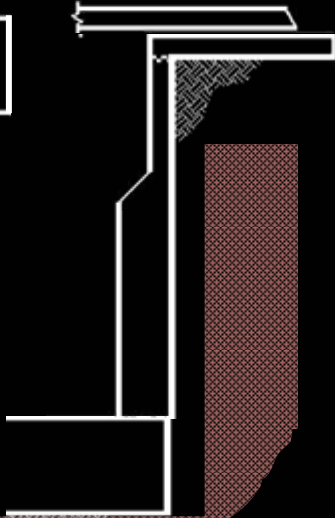
# Isolation Cost

*Will vary significantly from one project to another depending upon building configuration, proximity to fault, etc.*

Study of one project found the following breakdown of costs  
(\$ per sq ft of building footprint)



**Excavation: \$3**  
**Moat Walls: \$8**  
**Pedestals: \$5**  
**Isolators & Dampers: \$24**  
**Level 1**  
**Framing: \$15**  
**Moat Cover: \$3**  
**Misc: \$1**  
**Total: \$60**



# Hypothetical Two-Story, 100,000 sq ft Building

- Assume \$400/sq ft (of building area)
  - Construction cost: \$40,000,000
  - Assume isolation at \$40/sq ft (of footprint area)
  - Isolation cost: \$2,000,000
- 
- About 5% of construction cost (will vary from project to project)

# Why Isolate?

Best overall seismic performance of any lateral system currently available

# Code Performance

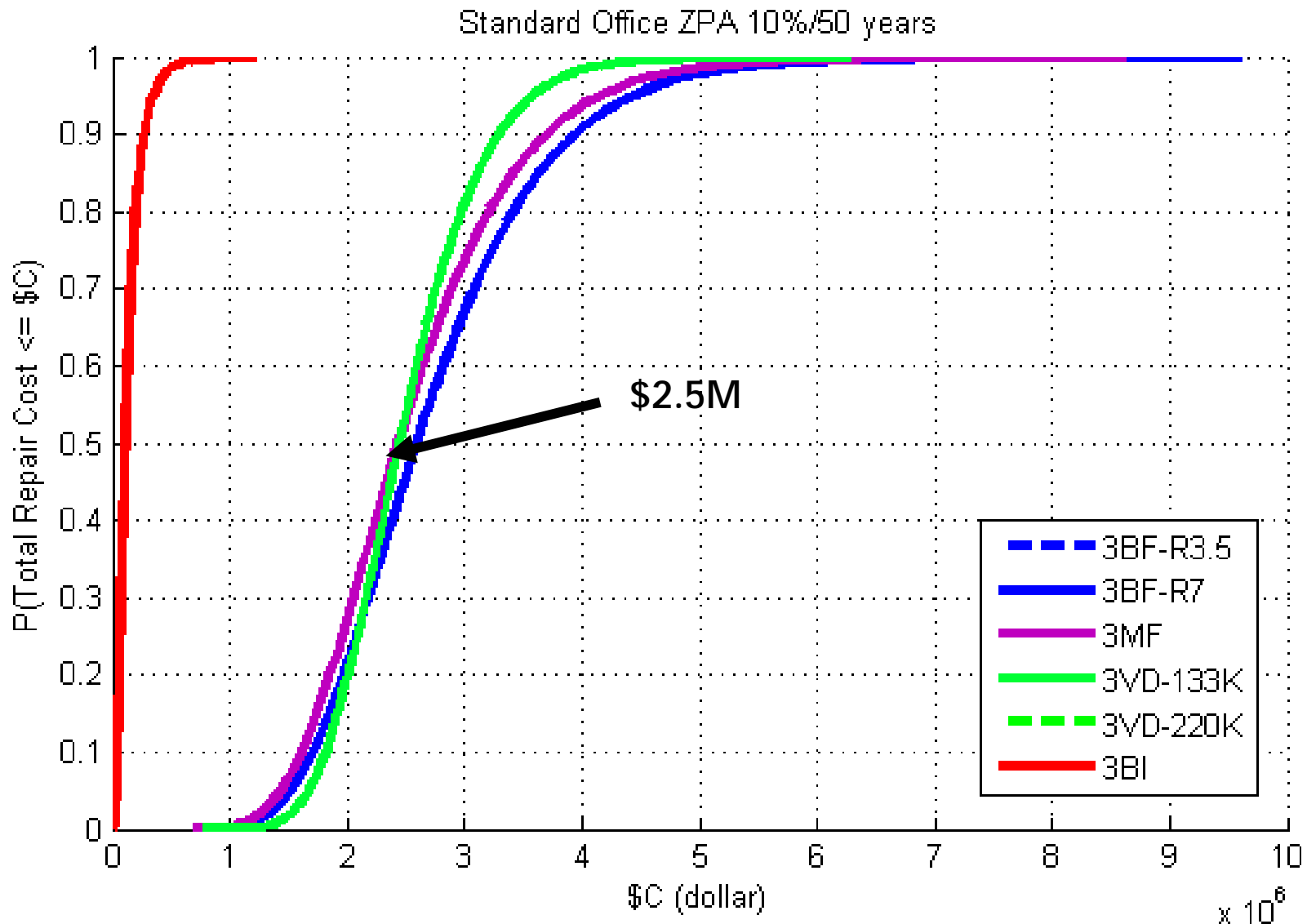
- Resist minor earthquake without damage
- Resist moderate earthquake without structural damage, possibly some nonstructural damage
- Resist major earthquake without collapse, possibly structural and nonstructural damage

– *SEAOC Blue Book*, 1999

# Base Isolated Building Performance

- Little damage in minor, moderate or major earthquake
- Probably limited to disruption of some contents

# Office Building: 10% | 50 Years Code Designs



# Operational



Mills Peninsula Hospital

# Valuable Contents



New de Young Museum

# High Performance Desired



Pixar Animation Studios