Between a Subduction Zone and a Hard Spot!
The Kodiak Experience
FUNDING FOR VULNERABLE SCHOOL FACILITIES
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Kodiak Island
Island Terrific in the North Pacific

- Second largest island in the U.S.
- Home to one of the largest commercial fishing fleets in the U.S.
- Home to the largest carnivorous land mammal in the world.
- Located in a maritime climate where the climate is foggy and windswept.
- Substantially damaged during the 1964 Great Alaskan Earthquake and Tsunami
Recognition of Potential Dangers

• Retired Geology professor moved to Kodiak identified unknown faults and recognized significant ground movement that could occur jeopardizing public facilities.

• USGC Engineer determined USCG base had a vulnerable school facility. Other schools in the City of Kodiak identified as possibly vulnerable.

• Schools are not just educational facilities, but evacuation shelters, host community events etc.

• Recognition that students, teachers and parents spend substantial time school facilities
Public Awareness

- Public meetings pointed out vulnerability of school facilities.
- Review of blue prints demonstrated that many of the two story structures at risk.
- Schools constructed in the 1940’s, 50’s & 60’s.
- Those schools that were single story, built of wood framing and constructed recently benefitted from improvement in seismic design and changes in the building code.
Public Vote

- Citizens approved $500,000 for school vulnerability assessment.
- At the same time, approved energy efficiency retrofits to schools (HVAC upgrades, insulated siding, window replacement).
- Major maintenance safety projects for schools (Asbestos removal, earthquake damage and concrete repair) were also approved.
Request for Proposals

- RFP drafted to address issues important to reviewing the safety of schools.
  a. Geology
    1. Local geology
    2. Determination of energy generated from identified faults
  b. Structural integrity of existing buildings
    1. Through structural engineering review of plan sets.
  c. Economic evaluation: benefit-cost study
    1. Needed to be completed to apply for a FEMA Predisaster Mitigation (PDM) grant.
Results of Analysis

• A number of older school were at risk
  
a. Older buildings constructed in the 50’s – 60’s under older seismic codes.
  
b. Could not withstand the ground motions generated from local faults.
  
c. Severe ground motions can come from faults located closer to Kodiak than those generated from a subduction zone quake.
Other Funding

• Economic benefit – cost analysis demonstrated that Kodiak would qualify for a PDM grant from FEMA.

• Other money available through the state of Alaska, Hazard Mitigation Grant Program (HMGP).

• Retrofitting these vulnerable structures was such a top priority for residents and politicians that they were also identified for funding approved by the state legislature.

• One project was vetoed twice by then Governor Sarah Palin before it was finally approved.
Timing is Everything

• Small, affluent town made retrofitting these structures a priority. Tax themselves $500,000
• Though fishing in the North Pacific can be dangerous, going to school in public buildings should not be.
• Fishermen, processor workers and Kodiak families determined that this was a community priority.
• Local news coverage was ceaseless, became a teaching moment for the town about earthquakes and tsunami dangers.
Conclusion

• Don’t underestimate the power of one person who understands the consequences of doing nothing and makes this known to other professionals.
• Don’t underestimate teachers and parents who live or have children who spend significant time in vulnerable school facilities.
• Don’t underestimate an energized and mobilized PTA to politically move this project forward.
• Don’t underestimate a community who now understand what a dynamic location we live in perched on the edge of the North Pacific.
KODIAK HIGH SCHOOL
Construct Shear Wall
Excavating to Footing
SHEAR WALL – FOOTING EXPANSION
FOOTING EXPANSION – EXTERIOR
NELSON STUDS
COMPLETED FIRST FLOOR
SHEER WALL
PREPARATION OF SECOND FLOOR
COMPLETION OF SHEAR WALL
PROJECT COMPLETION
KODIAK MIDDLE SCHOOL
MULTIPLE ROOF LINES
MULTIPLE ROOF LINES
SHEAR WALL INFILL
FINISHED SHEAR WALL
ATTACHING WALL WITH FOUNDATION
Strong Tie – Anchor bolts
Drag Strut Connector – Transfers shear forces to shear walls.
Additional connections ceiling to carrier beam to wall.
Connecting Roof to Walls
Redecking Roof
Project Completed
Finished Shear Wall
Kodiak is located in a Dynamic Environment – 1964