

## Quarterdeck Meeting 4/3/12

- Shock Testing Equipment for US Naval Service
- Presenter Steve Kemp
- Requirements come from MIL 901 S-D (Navy document)
  - Covers high impact shock testing requirements for shipboard machinery, equipment, systems and structures, with the exception of submarine pressure hull penetrators.
  - Meant to verify the ability to withstand very big loads.
- Two shock grades
  - Grade A – cannot fail no matter what (focus of this presentation)
  - Grade B – secondary system, can fail as long as it does not cause a Grade A system to fail
- Three Classes
  - Class I – mounted directly to ship
  - Class II – resiliently mounted (focus of this presentation)
  - Class III – mounted to deck with some isolators
- Three ways of testing
  - Lightweight with light testing machine (swinging hammer)
  - Medium (bigger hammer)
  - Heavy (explosions)
- Test Setup:
  - 4 shots – 60 lb. explosive charge at 24 ft. deep
    - Shot 1 – 40' off the bow, easiest to pass (Qualifying run)
    - Shot 2 – 30' off the side
    - Shot 3 – 25' off the side
    - Shot 4 – 20' off the side, hardest to pass (Qualifying run)
    - Qualifying means the equipment being tested needs to run before, during, and after the test.
- Modeling the system
  - Use complex non-linear differential equations
  - Use Laplace transforms to solve for the unit step function or impulse function
- Generator set tested here was for the LCS built by Austal
- More rigid frame, which makes it stronger
- The test generator set had to be mounted the same way on the test barge as on the ship
- It takes a very long time to build the test structure because it is all custom with a lot of instrumentation.
- Cool Videos