

CSE 453

Hardware/Software Integrated System Design *Project Planning & Initial Design Process*

Consequences of Poor Planning

- 35 Engineering Mistakes That Could (Should) Have Been Prevented

Solutions That Should Have Never Been

- Shoe Fitting Fluoroscope

🔗 Wikipedia

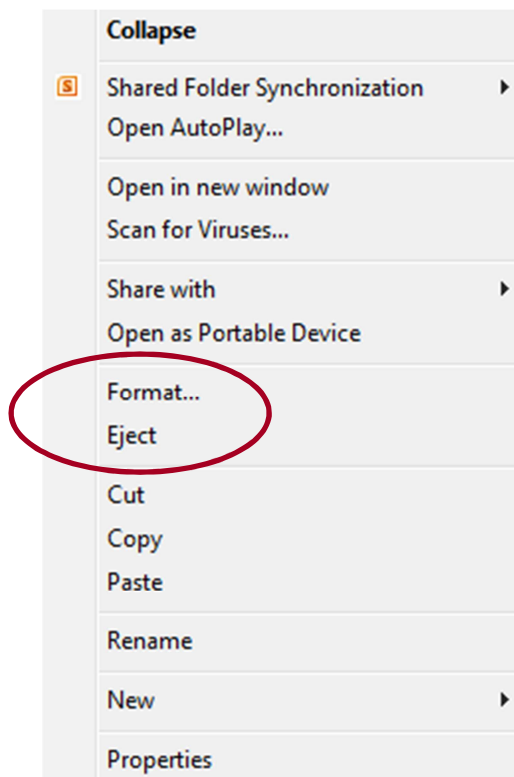
🔗 https://en.wikipedia.org/wiki/Shoe-fitting_fluoroscope

🔗 Video

Just Plain Bad Designs:

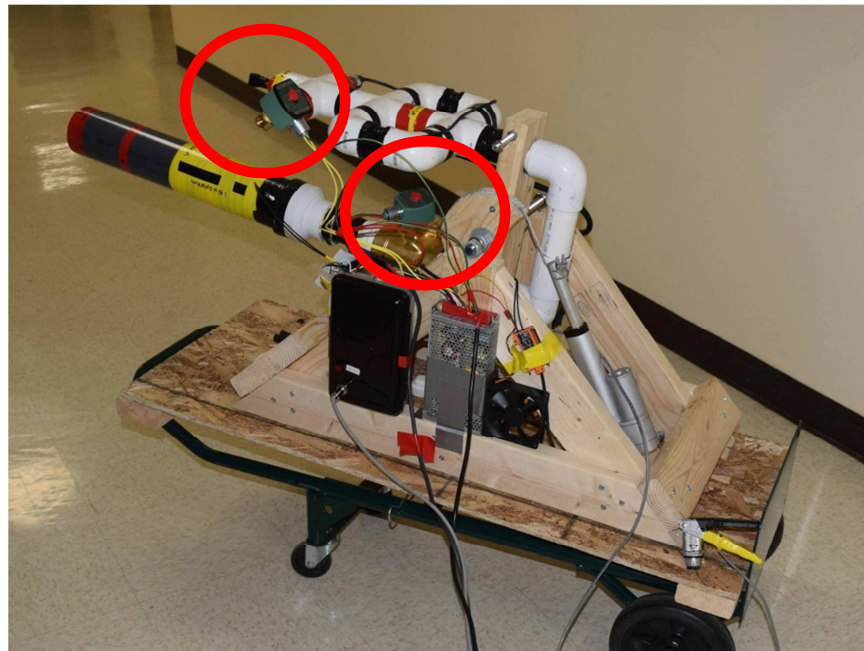
Consequences of Poor Planning

- 1987 Chevy Silverado Dual Tank Pickup Truck
 - 🔗 Gas tank filler necks are on both sides of the truck
- Consider Ejecting a Thumb Drive in Windows 7



Project Scheduling

- Analysis
 - ☞ Understanding the Problem
 - ☞ Requirements Document
- Brainstorming
 - ☞ Good Brainstorming Techniques
 - ☞ Think out of the Box
 - ☞ Be Creative
 - ☞ No Ideas Off the Table
 - ☞ Restriction Limits Ideas
 - ☞ Examples
 - ☞ Reference on Various Techniques
 - ☞ <http://www.integratingengineering.org/workbook/documents/BrainstormingToolkit.pdf>
- Design
 - ☞ Safety
 - ☞ Fail Safe Design
 - ✓ What happens if something fails?
 - ✓ What happens if there is a power loss?
 - ✓ Consider the Cannon



- ☞ Solenoids: Normally Open or Closed?
 - ✓ Automated Locker Discussion
- Implementation
 - ☞ Build Phase
- TestingDelivery
- Support

- Iterative Process
 - ☞ Implementing and testing may take you back to the design phase
- Design vs. Testing
 - ☞ A good design can minimize problems down the road
 - ☞ At the same time, don't underestimate the time required for testing

Errors in the Design Process:

The Importance of Testing & Checkout

- MARS Climate Orbiter & MARS Polar Lander
 - ☞ Video

Gantt Charts

- Project Scheduling Chart
 - ☞ Bar Chart
- Depict Start/End Dates of Particular Components of the Project
- Interdependencies are Considered
- Developed By:
 - ☞ Karol Adamiecki (1896)
 - ☞ Henry Gantt (1910's)
 - ☞ Both Independently
- Software
 - ☞ Microsoft Project
 - ☞ Gantt Project
 - ☞ Free Open Source Software
 - ☞ Available for Windows, MacOS, Linux
 - ☞ <https://sourceforge.net/projects/ganttproject/>

References

- <http://www.integratingengineering.org/workbook/documents/BrainstormingToolkit.pdf>
- <https://www.youtube.com/watch?v=C67ULHBg2hw>
- https://en.wikipedia.org/wiki/Shoe-fitting_fluoroscope
- The Red Green Show, S&S Productions, Season 13, Episode 247, October 31, 2003
- Modern Marvels: Engineering Disasters 3, The History Channel, Season 7, Episode 12, April 16, 2001
- Modern Marvels: Engineering Disasters 18, The History Channel, Season 12, Episode 4, February 8, 2006