

Due this week!

- PDR Written
- PDR Oral Presentation

- K'Nex kits distributed
- Venues assembled in EGC

Test Plans

EGR 107

Due: 5 or 6 April, 2016

Engr. Expo Competition – 8 April!!

A Plan is a detailed scheme for the accomplishment of a goal

- WHAT is to be done
- HOW the goal will be accomplished
- WHY each task is to be undertaken
- Pass/Fail Criteria for each test
 - measurable criteria for success
- Anticipates the use of resources - time, money, equipment, facilities, and people

A list of tests is not a plan.

- Does not explain:
 - Why the tests are being performed
 - How the tests are to be conducted
 - Resources needed to accomplish the plan

Tests require:

- (1) A model or prototype (or at least the part being tested)
- (2) A testing facility
- (3) Instruments for measuring what occurs
- (4) A test plan
 - **pass/fail** criteria for each test.
 - specific measures/standards for success.

Typical engineering tests

- Performance tests
- Quality assurance tests
- Life, endurance, and safety tests
- Human acceptance tests
- Environmental tests

- A given system or device may or may not require some of each test type

Performance Tests Results

- Does the design meet the performance specification?
- For example,
 - Complete a task in specified time
 - Weight within specification
 - Not melt at Temperature
 - Not break under Forces

QA Tests

- Verify materials where data not available, or not certain.
 - Welds
 - New materials
- Verify purchased components work as design requires
 - Limits of duty cycles, frequency, voltage, energy

Life, endurance, safety testing

- How long will device last?
- How safe is the device?
 - At what load will it fail, not fail?
(hopefully you have a spare if it fails)
- Validate any condition you could not sufficiently model.

Human Acceptance Tests

- Is the device ergonomically acceptable?
 - User interfaces
 - Physically acceptable
 - Weight
 - Dimension
 - Range of motion
 - Visually acceptable
 - Displays: easy to read, right height
 - Colors: Pleasing, focuses attention when desired
- **Statistically significant** number of surveys after use by test subjects.

Environmental test

- Is the device affected by varying environments?
 - Sunlight (UV), temperature
 - Wind, rain, static electricity
 - Electro-magnetic noise effects
- Does the device affect the environment?
 - Oil leaks
 - Pollution , run-off
 - Recycle disposables?

Test Plans should support

- Project goals
- Feasibility criteria
- Merit criteria

- Requirements, promises, claims, and assumptions that guided the design process

Test Plan Format

The plan for a single test should have most/all of these items:

Test Name:

Type of Test: (performance, environmental, etc.)

Equipment Needed:

Location(s): (where is it performed?)

Date(s) and or/total time required:

Test Objective:

Criteria for success: (pass/fail criteria)

Procedure:

(A table could be made for each test)

Additional Notes:

- In EGR 107 (and XXX 487), the Test Plan is provided after the PDR has been completed successfully.
- Test results are typically provided in the CDR.
- **Use the EGR Memo Template and Formatting Guidelines**

Test Plan for Coffee Vending Machine

- Performance tests
- Quality assurance tests
- Life, endurance, and safety tests
- Human acceptance tests
- Environmental tests

Vending machine is a unit which provides coffee in exchange for coins

- Does it give the correct change
- How fast can it process the request
- What if an item is out of stock
- What if it is overfilled
- What if the change drawer is full
- What if the user puts in too little money
- What if it is out of change

Then there are the interesting cases, which normal users wouldn't think about

- What if you try to tip it over
- Give it a fake coin
- Steal from it
- Put a coin in with a string
- Give it funny amounts of change
- Give it half-ripped bills
- Pry it open with a crow-bar
- Feed it bad power/brownout
- Turn it off in the middle of various operations

Potential tests for your vehicle?

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