1 Static Test Cell

Figure 1: Example

Transducer Techniques Load Cell	500 lbs	
What else should be in RTC mech specs???	r2c2	r2c3

Table 1: Static Test Cell Specifications

1.1 Design

1. Brief overview of old system
   (a) General idea of how system works: how engine is mounted, where thrust is being measured, data available to be collected
      i. Engine is mounted at combustion chamber flange to rig.
      ii. Rig is essentially a cage that is constrained by rollers within I-beams. Plate at top of rig has a rigid connection to load cell, and thrust is measured from the top of the set-up.
   (b) Problems with system that drove redesign
      i. LOAD CELL: Load cell data not depicting accurate thrust or thrust calculated from pressure transducers and thermocouples. Friction in the system; loss of peak thrust due to wood between load cell and rig (to protect against initial spike when engine ignites); potential off axis loads that would not register at load cell **OLD LOAD CELL DATA**
      ii. RIG: Alignment issues with rig pieces
      iii. ROLLERS: Tedious and difficult to align; caused friction along I-beams
2. Redesign
   (a) Ball joint assembly to make set-up more robust and less susceptible to data loss
      i. Ball joint accounts for any off axis forces due to it's ability to deflect by small angles
      ii. Replaced wood piece with steel; less likely to dampen initial peak thrust at beginning of ignition
      iii. **NEW LOAD CELL DATA**
   (b) Rig redesign to make system set-up quicker, safer, simpler, and more robust
      i. Switch angle iron configuration to provide easier access to plumbing and connections
      ii. Redesign top plate due to difficulty bolting angle irons while holding engine in place
      iii. New attachment points at combustion chamber flange pieces to prevent future alignment issues
      iv. Replace rollers with simple pieces of conduit that will guide the rig (keep away from I-beams) but will not be a sources of friction due to constraints within I-beam **this probably needs a picture of where the friction is thought to occur - side of I beams - and how new roller will eliminate that**

v. modes of failure; analysis for each mode. Angle iron attachments, engine attachments, ball joint, etc.

3. Final specifications

   (a) FEA on ball joint assembly (one with force normal to ball joint face, one with force at small angle)

   (b) CAD of ball joint assembly (ref engr drawing)

   (c) CAD of over all rig with engine

   (d) CAD of close up on change of rollers (old and new)

1.2 Manufacturing

Here is where you will describe the manufacturing process of actually fabricating the part.

- Ball Joint assembly pictures
- rig pics
- test cell pics

1.3 Testing

Load cell data

- old calibration curves
- new calibration curves
- compare thrust curves; peak thrust, fill weight, etc.

References

[1] your mom