- I can't figure out still
- Increased traffic on streets
- Next week
- Fuse
- Who's spread out circuitry
- Last week

- it's slightly easier

- Prices
- Fatigue or mental overload
- Planning
- Throw
- Layout of tools (except for saws)

- Need to consider: (lower gap equal)

- Rail design

Week 14
- Overhead track 8 feet tall $45.95
- Double wheel
- Weight for 24% 4016 lbs.
  $59.95 6x8 avg $4 100 lbs. 14 ga.
  $89.51 6x8
  $20.00

[Diagram of two metal columns]
Friday 16th 2007

- Met with Dr. Henderson to discuss/get an opinion on the trail that we have designed.
- In the afternoon went to a welding shop to get estimates on building the rail.

Monday 12th 2007

- Drive to a company in C35/Belecke & got the prices listed on the proposal.
COMPOSITION

LIDA BABIKIR

Senior Design

ET 4324

Dr. Steinmetz

100 sheets • 200 pages • 9.75 in x 7.5 in • 24.7 cm x 19.0 cm
- Divided preliminary task
  - Biju → fuel control system
  - Arun → jet engine
  - Ridda → design the mechanism for moving the jet in vertical motion.

- Kerosene
  - Hydrocarbon liquid similar to diesel
  - Energy: 18,500 Btu/lb or 43.1 MJ/kg
  - Used to power jet-engined aircraft
  - Carbon chain consisting of 12 to 18 carbon atoms.
  - Formula: C_{n}H_{2n+2}, e.g. C_{12}H_{26}, C_{16}H_{34}

- Safety requirement for using jet engine:
  - Safe distance: [JETA at USA]
  - Front of turbine = 15 ft
  - Side = 25 ft
  - Behind = 15 ft
  - Use earplugs
- Use CO₂ instead of powdered extinguishers as it may contaminate the precision.
- Mix fuel (kerosene) with 5% synthetic oil.
- Use propane/butane (60/40%) mixture as a starting gas.

- 1 gal = 128 fl oz
- JF-50 Bee Titanium [ArtechJet.com]
  - Thrust: 6.3 kg/14 lbs
  - Revolutions: 180,000 rpm
  - Exhaust temp: 500-700°C
  - Consumption: 4-6 oz/min x 1/8 x 32 = 21.3 oz/hr
  - Weight: 800gm/1.7 lb
  - Diameter: 80mm/3.5 inches
Snaking Gas Diagram

Normal values for the pump start voltages are between 0.100 and 0.325V.

Note: All 115V AC/L230V AC (except as noted).

Fuel System Connection Diagram

Schematic Blu
Power Available vs. Velocity (Jet)

- More efficient at high rpm
- Slightly more efficient at colder air temperatures

Jet engine efficiency is not affected by velocity (in supersonic flight) or altitude.

Climb performance on the next page.

We will return to this when we look at the graph showing maximum thrust.

The available thrust does not change as the engine is run at higher rpm.

Jet engines are designed to run at much higher rpm than piston engines. They are also quite

Jet Engine Efficiency
### Small Computer Controlled Jet Engine using LabVIEW

**Objective**
- To control jet engine
- To control fuel flow of jet engine using LabVIEW
- To demonstrate the jet engine control by guiding it to move in vertical direction

**Development Plan**

- **Jet Engine**: We will be using the jet engine that we purchased.
- **Fuel Pump**: We will buy the pump designed for jet engine.
- **Vertical Stand**: We will design and build a stand to vertically support the jet engine.
- **Controlling**: We will use LabVIEW to control the jet engine and a computer to record the data.

**Time Line**

<table>
<thead>
<tr>
<th>Week</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Order Parts</td>
</tr>
<tr>
<td>9</td>
<td>Write LabVIEW code</td>
</tr>
<tr>
<td>10</td>
<td>Construct vertical stand</td>
</tr>
<tr>
<td></td>
<td>Read manual for engine</td>
</tr>
<tr>
<td></td>
<td>Assemble engine</td>
</tr>
<tr>
<td></td>
<td>Test jet engine</td>
</tr>
<tr>
<td></td>
<td>Test LabVIEW</td>
</tr>
<tr>
<td></td>
<td>Tweak the LabVIEW</td>
</tr>
<tr>
<td></td>
<td>Final Documentation</td>
</tr>
</tbody>
</table>

**Background**

Jet Engine: It is an engine which generates a thrust by the discharge of fast moving jet of fluid [1].
Available Resources

- Total cost for Rail Track = $9.69
  - Ground Stand (4’x8’) 100lbs - $59.95
  - Double Wheel Trolley - $200.00
  - Overhead Rack (8 feet) - $15.95

Rail Track:

- Ideal P-60 rail: complete set 2'495.00 [2]

Budget

- Design a rail to move the fast engine in vertical motion

Responsibilities

- Ridda Babiker: Senior Student of Bachelor of Electrical Engineer at UTA

- Collect detailed technical specifications of the fast engine

- Amin Ahmed: Senior Student of Bachelor of Electrical Engineer at UTA

- Design fuel control system for fast engine

Responsibilities

- Bilhu Shemshaa: Senior Student of Bachelor of Electrical Engineer at UTA

Key Personnel and Management Plan
Section 5: Fire and Explosion Data

Flammable Limits: Lower: 0% Upper: 5% - 7%
Flash Point: Closed Cup: 38°C (100°F) (Englyse) 210°C (410°F) (Englyse)
Auto-ignition Temperature: 210°C (410°F) (Englyse)
Flammability: Flammable
Products of Combustion: Not available

Section 4: First Aid Measures

Organic Peroxides may produce general depression of health by an accumulation in one or many human organs. Prolonged exposure to the substance can produce irritation of the skin, damage to the respiratory system (CNS), the sublethal may be toxic to the nervous system. Mice, rats, other animals.

Eye Contact
Flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

Skin Contact
In case of contact: Immerse skin with plenty of water. Cover the injured skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Wash with a satisfactory soap and cover the contaminated skin with an emollient cream. Seek immediate medical attention immediately.

In case of contact: Immerse skin with plenty of water. Cover the injured skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse.

If exposed to heat, remove to fresh air if not breathing. Give artificial respiration. If breathing is difficult, give oxygen. Call medical attention immediately.

Inhalation
If inhaled: Remove to fresh air if not breathing. Give artificial respiration. If breathing is difficult, give oxygen. Call medical attention immediately.

Ingestion
If swallowed: Do not induce vomiting. If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie.

Section 3: Hazards in the Presence of Various Substances

Flammable in presence of open flames and sparks of heat.