#### Table 1: Bending Test Data for Design #1

|  |  |  |  |
| --- | --- | --- | --- |
| **applied force****(N)** | **moment arm****(cm)** | **Bending moment (N-cm)** | **tower deflection (cm)** |
|  |  |  |  |
| 0 | 24 | 0 | 0 |
| 2 | 24 |  |  |
| 4 | 24 |  |  |
| 6 | 24 |  |  |
| 8 | 24 |  |  |
| 10 | 24 |  |  |
| 12 | 24 |  |  |
| 14 | 24 |  |  |
| 16 | 24 |  |  |
| 18 | 24 |  |  |
| 20 | 24 |  |  |

Table 2: Bending Test Data for Design #2

|  |  |  |  |
| --- | --- | --- | --- |
| **applied force****(N)** | **moment arm****(cm)** | **bending moment (N-cm)** | **tower deflection (cm)** |
|  |  |  |  |
| 0 | 24 | 0 | 0 |
| 2 | 24 |  |  |
| 4 | 24 |  |  |
| 6 | 24 |  |  |
| 8 | 24 |  |  |
| 10 | 24 |  |  |
| 12 | 24 |  |  |
| 14 | 24 |  |  |
| 16 | 24 |  |  |
| 18 | 24 |  |  |
| 20 | 24 |  |  |

## Table 3: Torsion Test Data for Design #1

|  |  |  |  |
| --- | --- | --- | --- |
| **applied force****(N)** | **moment arm****(cm)** | **twisting moment (N-cm)** | **angular deflection of tower (degrees)** |
|  |  |  |  |
| 0 | 14 | 0 | 0 |
| 2 | 14 |  |  |
| 4 | 14 |  |  |
| 6 | 14 |  |  |
| 8 | 14 |  |  |
| 10 | 14 |  |  |
| 12 | 14 |  |  |
| 14 | 14 |  |  |
| 16 | 14 |  |  |
| 18 | 14 |  |  |
| 20 | 14 |  |  |

## Table 4: Torsion Test Data for Design #2

|  |  |  |  |
| --- | --- | --- | --- |
| **applied force****(N)** | **moment arm****(cm)** | **twisting moment (N-cm)** | **angular deflection of tower (degrees)** |
|  |  |  |  |
| 0 | 14 | 0 | 0 |
| 2 | 14 |  |  |
| 4 | 14 |  |  |
| 6 | 14 |  |  |
| 8 | 14 |  |  |
| 10 | 14 |  |  |
| 12 | 14 |  |  |
| 14 | 14 |  |  |
| 16 | 14 |  |  |
| 18 | 14 |  |  |
| 20 | 14 |  |  |

**Graph #1: Bending Moment v. Deflection of Raytheoff Radar**

**Antenna Towers – Comparison of Designs #1 & #2**

**Graph #2: Twisting Moment v. Angular Deflection of Raytheoff**

**Radar Antenna Towers – Comparison of Designs #1 & #2**

Table 5: Bending Test Data for Design #3

|  |  |  |  |
| --- | --- | --- | --- |
| **applied force****(N)** | **moment arm****(cm)** | **bending moment (N-cm)** | **tower deflection (cm)** |
|  |  |  |  |
| 0 | 24 | 0 | 0 |
| 2 | 24 |  |  |
| 4 | 24 |  |  |
| 6 | 24 |  |  |
| 8 | 24 |  |  |
| 10 | 24 |  |  |
| 12 | 24 |  |  |
| 14 | 24 |  |  |
| 16 | 24 |  |  |
| 18 | 24 |  |  |
| 20 | 24 |  |  |

## Table 6: Torsion Test Data for Design #3

|  |  |  |  |
| --- | --- | --- | --- |
| **applied force****(N)** | **moment arm****(cm)** | **twisting moment (N-cm)** | **angular deflection of tower (degrees)** |
|  |  |  |  |
| 0 | 14 | 0 | 0 |
| 2 | 14 |  |  |
| 4 | 14 |  |  |
| 6 | 14 |  |  |
| 8 | 14 |  |  |
| 10 | 14 |  |  |
| 12 | 14 |  |  |
| 14 | 14 |  |  |
| 16 | 14 |  |  |
| 18 | 14 |  |  |
| 20 | 14 |  |  |

**Graph #3: Bending Moment v. Deflection of Raytheoff Radar**

**Antenna Towers – Comparison of Designs #1 & #2 & #3**

**Graph #4: Twisting Moment v. Angular Deflection of Raytheoff**

**Radar Antenna Towers – Comparison of Designs #1 & #2 & #3**

1. How do the stronger designs compare to the original antenna on the graph?
2. How does the first redesign compare to the second redesign on the graph?
3. What would the ideal design look like on the two graphs?