Cable Design Project

**Problem Description:** The task is to design a cable that will support a 60 ton vehicle. The cable is 25 foot long and can have an elastic deformation of no more than 10%. Using the Modulus of Elasticity for various metals design a cable. Use standard cable diameter sizes listed below (units are inch):

|  |
| --- |
| 2 |
| 1 3/4 |
| 1 1/2 |
| 1 1/4 |
| 1 |
| 3/4 |
| 1/2 |
| 3/8 |
| 1/4 |
| 3/16 |
| 1/8 |
| 1/16 |
| 1/32 |
| 1/64 |

**The following will be generated as part of the project:**

Material information from Matweb (Done)

Thermal Expansion Analysis for the given conditions of 0°F to 300°F.

Fatigue analysis (S-N Curves) (only for Aluminum and Steel)

Power Point Presentation and Report

**Materials to be analyzed:**

2014-T6 Aluminum

1045 Steel

Copper

Titanium Ti-6Al-4V (Grade 5), Annealed

**Material Properties Given:**

**Coefficients of Thermal Expansion:**

Aluminum = 13.1 X 10-6 in/in-°F

Steel = 7.22 X 10-6 in/in-°F

Copper = 10.3 X 10-6 in/in-°F

Titanium = 5.39 X10-6 in/in-°F

**Modulus of Elasticity:**

Aluminum = 10,000,000 psi

Steel = 30,000,000 psi

Copper = 15,000,000 psi

Titanium = 12,000,000 psi