

Programme report example

[Health & Medicine](#), [Stress](#)



Project Title: Selection Materials

Module Code:

Project Due Date:

DCU Statement

Plagiarism means presenting another person's words, ideas, designs as your own word. Plagiarism comes in a different form, like copying text, diagram, formulae, etc. Plagiarism is a serious offence. Plagiarism is referred to the disciplinary committee of the university. Committee will take the serious action on the plagiarized materials.

Aim and Objective

This project is being aimed to model the stress the board by considering a typical beam supported by the equal pressure on the bottom and it must withstand a point force.

1. Introduction

The material selection is the process of designing a physical object. The main goal of the material selection is to minimize the cost, and it helps to achieve product performance. Selection of the best materials starts with the properties and the cost of the candidate materials. The cost of the materials plays the quite good role in their selection. The most significant and straight forward way is to weight the cost Vs property. The energy price is being increased, and the technology has been improved. The automobiles are increasing now days so increasing the weight of the magnesium and aluminum alloys. Most common methods of choosing the best materials are “Ashby Chart”. The materials with a maximum performance are being

selected. The material engineering understands that the material selection is the key to understanding any engineering applications. The materials selection is the foundation of any engineering application and designs. The appropriate materials are used in a particular application. The physical principles are used to change the material properties.

In this project, we have to design the long board of 3 M long and 0.75 M of thickness. The board materials have to be selected. The thickness is being selected of my choice. We have to model the stress in board by considering the equal pressure on the bottom.

The alloys of the metals are the oldest and the most fundamental processing technique. Alloy is some solid solutions, which was composed of two or more elements. The physical principles can select the best suitable materials. It is being decided with the best possible materials. This above mentioned design has to choose the best materials out of the appropriate design. The best suited materials are being taken into account by considering various factors such as cost, length, area of a cross section, size, etc. it is seen that the two lines intercept at the top of the graphs. The changes in the materials properties are needed to be considered. This material selection is the typical system that always needs to occur in a different phase. The materials selection process is being selected by considering the various factors. The different materials are being chosen for different application. The proper selection of the materials is necessary, example the gold and the silver is the best conductivities, but they are too expensive. A chart is an important factor for designing and selecting the materials.

2. Material Indices

The performance is being measured by the performance equation. The performance contains the group of material property. These types of groups are called as the material indices. The performance equation has two or more properties. That is the key to the optimal selection of the materials. The materials with the high values of an index maximize the performance. New materials will have good potential application in the indices. A faithful application of the new materials can be identified by the indices. The materials are crucial to perform, and its reliability is virtual in every technology sustainability and health. The material science and engineering is the process in which the material comes into being determined by its structure.

For example, let us consider the beam that is subjected to a different load conditions with the aim of minimizing its weight. These parameters of the beam are being organized in various categories. These categories are the material variables. It will include density, module, and other variables. The next cycle has different performance index. In order to maximize these beam for bending. The tensile stress equation of bending is being used. The next loading has the different performance index with a different equation. The cost of the ceramics is around the diamond area. The material indices are depended on the different factors. The factors are considered in many ways.

The material indices equation is represented by $1/m$, where m is the mass

$$\delta = \frac{3Wr^2}{4\pi EP} \frac{1-V}{3+V} \frac{1+V}{1+V}$$

Where E is the young's modulus, r is the radius of the plate. V is the poisons ratio. The material indices for the long plate can be determined from the

equation

$$\rho = m/v$$

Where ρ is the density, m is the mass, v is the volume. The density equation is rewritten in some of the equation or mass.

$$V = \pi r^2$$

The point $\rho^3 E$ can be isolated from the rest of the equation because this can be inverse the material index. It can be isolated from the rest of the equation. The best performance can be achieved by maximizing the inverse of mass, $1/m$

$$1/m = E^{(1/3)}/\rho \quad (1/a)$$

In order to find the material index of the longboard, the frame process is being used. T is once again free variable and it can be represented as

$$t^2 = A (wr/E) (1-V^2) h/r$$

The reason of the material index is an important in material selection, and it defines the performance. It is much useful because it represents the line of the graph.

$$1/M = E^{1/n} / \rho$$

N is the sum of number from finding the material index.

$$PN = 1/M^n = E$$

$$\log E = n \log l + \log 1/mn$$

$$Y = mx + b$$

Making the slope the line created by this equation is $\log 1/mn$. The material index can be represented as a straight line. Certain pieces are the problem statement entered according with the certain materials. This method is being performed for the ling data.

The cardboard in this situation has no machine ability. It can be easily molded, and the constant can be taken into consideration.

The components have the function to carry the load safely. It is used to transmit heat to store energy. Each function has associated with the material index. The materials with the good value of an index will maximize the performance. It will minimize the thermal distortion of the precision.

In some light weight design, the strength is not important, but both strength and density is an important criterion. We need to compare the several properties at once. There is lots of information and power on these charts.

They will provide materials property. The balloons are very easy to compare.

$$V = (S/\rho)^{1/2}$$

$$\log(S) = 2 \log(V) + \log(\rho)$$

$$Y = \log(S)$$

$$A = 2 \log(V)$$

The line connects materials will perform minimum weight design. This materials on the line it has the same value to constant as C. This thing may be thermally insulated. These are easiest to apply and often require the engineered around you. Line connects the materials will perform the minimum weight design.

It always gives a line of slope = 3

Log (E) Vs log (ρ)

$$X = \log(\text{Variable}) = \log(V)$$

$$Y = \log(\text{Modulus}) = \log(M)$$

In one unit X gives $x = \log(\rho) = 0$

Three units Y gives $y = \log(Z) = 2$

The selection chart is being used for selecting materials, in the application involving stiffness per unit mass. It was used in different applications, in the light stiff materials. It was under different loading conditions.

The materials at the large value of toughness are at the top of the chart.

Carrying the load safely is due to the fracture toughness.

The wood made of fibrous is the best suited materials. It is the material that can suite for the entire requirements. This design will suite the entire criteria. The wood with the fibrous materials will provide the light weighted materials. It is a cost effective materials.

Conclusion

The material selection is the process of a physical design. The main goal of material selection is to minimize and to achieve its product performance. The cost of the materials plays a quite good role. The main goal is to plot a graph against cost Vs properties. The materials with a maximum performance will be selected. The material selection is the key to any engineering applications. The appropriate materials are often used in all the engineering application. The performance is being measured by the performance equations. This is the key to the optimal selection of the materials. These are the material variables. This will include density, module, and other variables. The materials used for the mechanical design is wood; this category is used for designing the long board with the minimum cost.