

Refined design brief and User requirements/performance requirement

Refined design brief

After consulting and interviewing my client I now know exactly what my design brief is. The product I intend to make must carry more logs than my client's current method which is a log basket. The solution must meet the BSI standards that I have researched as well as further safety must be applied to mechanisms so that the force required to use them is less. All mechanisms must be designed so that they are easy to use for someone who is elderly. This could mean making larger handles or automatic features which require no human input. My client has specified that she would like the solution to have a modern look that preferably uses metals throughout the design. My client has given me a fixed price range which will help determine the size and quality of the product.

The goals and objectives I have set myself are to create a final product that appeals to wide ranges whilst solving the task at hand. Although my main target audience is for the elderly I want my product to be usable for all ages. The product should make moving the logs easier. In terms of schedule for this product it should be finished by the end of April. During the construction of this product I will be working mainly alone in the workshop and out of school apart from feedback from my teacher.

In terms of sustainability my client would like a product that damages the environment as little as possible. She would prefer it given the choice between two materials/finishes etc that I choose the more environmentally friendly option. Throughout my project I will take multiple steps where possible to be more environmentally friendly and to reduce my carbon footprint of my solution.

User requirements/performance requirements

To summarise generally what the client has asked for, the product must consider the following as well as meet the requirements of the client where necessary:

- Price must be affordable
- Mechanisms must be safe/easy to use without causing additional strain to the user
- BSI/CE
- Form
- Function
- Use of materials and how they can affect the environment
- Age consideration and how the product appeals to all ages
- Safety
- Scale of production
- Efficiency of production/meeting deadlines
- Sustainability

*BS=British Standards

Function

1. The log mover must carry a volume of 50L of logs.
2. There should be a method of easily loading/unloading the logs
3. The product must make the logs easy to transport
4. All mechanisms must function at all times, even under a strain of 100 Newton's or towards end of life (6 years)
5. The product must support a total mass of 50 kilograms
6. The product must have some form of adjustability

Justification

1. This is the volume of my client's previous solution and so this many logs carried would mean the log carrier is just as efficient as a wheelbarrow
2. The product must require little energy you use in order to reduce strain on the body and risks of injuries. This means not picking the logs up and bending down, they must be loaded using as little energy as possible
3. The products purpose is to make the logs easy to transport, this means reducing strain on the body and making the process of mobbing logs quicker and more efficient
4. The products mechanisms must function for the product to work as intended, they must be able to work under stress or there would be no need for the product
5. The product must be able to carry a lot of logs and so it must support them
6. Adjustability will mean more people can use this product as it will fit more people. As well as this people can adjust the product to their specific height which will make the product easier to use.

Form

1. The product must be aesthetically pleasing
2. Ergonomic consideration must happen when designing the product
3. The product must not offend any genders or religions.
4. The product must fit into all its environments
5. The product must be of modern day design
6. Function must be prioritised over form

Justification

1. If the product is aesthetically pleasing then it will be more likely to be purchased by multiple people and so sales would be better
2. The product must fit the user well and the design must ensure that the product is comfortable to use
3. The product should be neutral so that it will not offend people and risk being taken of the market/boycotted for being offensive.
4. The product must be designed so that it matches well with other colours and that it fits in its environment, it must not be an eye sore when placed in a user's environment
5. I want my product to look modern and follow trending designs so that more people will buy my product as well as more people will think it is trendy
6. The product must look good but how the product works is the main focus of this design problem

Performance requirements

1. The product must be stable, must meet BS EN 1730 standard
2. BS 4875-1 and BS EN 1728 must be met
3. BS 3963-6 test level 5 must be met

Justification

1. The product must be stable at all times including loading/un-loading and whilst moving in order for the logs not to fall off the log mover
2. The product must be able to support the force from the logs and other masses
3. The product must be resistant to mechanical damage otherwise the product will not fit its desired function

Quality Control

1. Must be made to a $\pm 5\text{mm}$ accuracy
2. Product must be thoroughly checked before being placed on the market

Justification

1. This means the product will be correctly made and so all its functions will work
2. This ensures that the product will be of the highest quality

Specification

Dimensions

1. The product must be no larger than 600mm x 600mm x 500mm
2. The product must have no jetting out edges of more than 150mm
3. The product must have a maximum displacement adjustability of $\pm 400\text{m}$
4. The product must have handles with a maximum diameter of 50mm

Justification

1. The product should be able to fit into confined spaces such as through a door frame so that the logs can be transported from outside to inside the house
2. This is to ensure that the product is compact and can fit into confined spaces
3. The product must be adjustable if necessary however the product must not extend the limit otherwise it will be unusable for some users
4. The handles need to be a reasonable size so that as many people as possible can use the product

Safety

1. My product should meet the BSI sharpness test
2. The product must have a mass of no more 15 kilograms
3. All mechanisms must have safety precautions such as avoiding finger traps

Justification

1. My product must be soundly made as well as safe otherwise there is a risk of the injury.
2. The log carrier must be lightweight to reduce strain injuries on the body especially the back
3. Mechanisms must have safety features to reduce injuries and the product breaking

Materials

1. The log mover must be hard and durable according to BS EN 1730
2. The product must use waterproof materials and be resistant to all types of corrosion
3. The log mover should be made from long lasting and sustainable materials
4. Low maintenance materials should be used

Justification

1. When the logs are moved or dropped into the log carrier there is a risk of the product being dented/scratched and so the product must be hard/tough to prevent the product being damaged, otherwise the products shape will deform easily and this could render the product unusable
2. My product will be used largely outside in poor conditions and so it must be resistant to physical and biological corrosion as well as it must be waterproof. The product must not corrode and if the material does it must be coated to protect the metal
3. My client wants her product to be as eco-friendly as possible and would like to cause as little damage as possible on the environment (e.g. FSC sourced wood)
4. Materials used should have a low up-keep in order for the product to remain functional as well as for it to look good

Ages

1. The product must fit the age range of 18-89 years old
2. The product must have no parts a young child could injure themselves on

Justification

1. My client is currently 81 and so she is above the usual maximum of 65 for many products, because of this I would like the product to suit as many ages as possible.
2. This is so that the product can be used in family environments etc as well as it will stop more injuries

Cost

1. The product should cost no more than £100

Justification

1. Current existing solutions vary in prices greatly but I feel for this price a high quality well-made product can be designed and produced

Scale of production

1. One-off but looking to Batch production for the final product
2. Jigs will be used

Justification

1. My product is mainly focused on my client however it could easily be batch produced and by allowing for this I will be able to respond to market trends to improve my product
2. Using jigs will increase the accuracy and quality of my product as well as it will speed up manufacturing speeds

Sustainability

1. The log mover should be made from long lasting and sustainable materials
2. Varnishes/sealers used on the product must be eco-friendly and non-toxic where possible
3. Un-used materials must be recycled if possible
4. Machines should be used as little as possible
5. Similar materials must be used
6. The product should be easy to disassemble at the end of the products life

Justification

1. My client wants her product to be as eco-friendly as possible and would like to cause as little damage as possible on the environment (e.g. FSC sourced wood)
2. My client would like the product not to harm the environment as well as toxic chemicals must not be used in order to protect the user/environment
3. If as much unused material is recycled the carbon footprint of the product will be less and so it will have less impact on the environment
4. To reduce the carbon footprint of the product, high energy machines should be used at a minimum
5. Using similar materials will make the product easier to recycle at end of life
6. By making the product easier to take apart it will be easier to recycle

User requirements

1. The product must carry more logs than the previous log mover she moved
2. My client says she wants her product to be generally eco-friendly

Justification

1. My client not only wants a better product she also wants it to carry more logs so she can reduce the number of log journeys she makes
2. Although quite a general term I will look to implement eco-friendly design and manufacture methods where possible