Developing an Attributes List

Using the answers from your Questions List to develop a list of attributes for the design.

Taken from *engineering design: a project-based introduction* by dym & little

An Attributes List contains a list of objectives, constraints, functions, and implementations.

- ***Objectives*** **(or *goals*) are expressions of the desired attributes and behavior that the client or potential users would like to see in the designed object.**
- ***Constraints*** **are restrictions or limitations on a behavior or a value or some other aspect of a designed object's performance. Government regulations are often a source of design constraints.**
- ***Functions*** **are the things a design is supposed to do – the actions that it should perform.**
- ***Requirements*** **are functional or non-functional specifications that the design must meet. Requirements are often generated by the client.**

Here is a partial, uncategorized Attributes List for a "safe ladder" design.

- Used outdoors on level ground
- Used indoors on floors or other smooth surfaces
- Could be a stepladder or short extension ladder
- Step deflections should be less than 0.05 inches
- Should allow a person of medium height to reach/work at levels up to 11 feet
- Must support weight of an average worker
- Must be safe
- Must meet OSHA requirements
- Must be portable between job sites
- Should be relatively inexpensive
- Must not conduct electricity
- Should be light

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  - Should be relatively inexpensive
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- Constraints
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  - Must meet OSHA requirements
  - Must not conduct electricity
  - Step deflections should be less than 0.05 inches
- Functions
  - Should allow a person of medium height to reach/work at levels up to 11 feet
  - Must support weight of an average worker
- Requirements
  - Must weigh less than 20 pounds

Here is an example of a partial (uncategorized) Attributes List for a 2008 BEST robot

- **Must be less than 24 pounds**
- **Must fit into a 24-inch cube**
- **Able to pick up individual plane parts**
- **Able to assemble plane parts**
- **Able to drive over a 1" x 4" board**
- **Able to close and open switch**
- **Should have zero-radius turn**
- **Should be able to carry a fully-assembled plane**
- **Should be able to lift a fully-assembled plane to a height of at least 36 inches**

Below are some tips for developing an Attributes List.

- **Start with a good list of questions.**
- **Use the answers to the questions to begin creating the Attributes List.**
- **You don't have to categorize the list at the beginning of the process, unless you prefer to start with the categories.**
- **The attributes that can be quantified become the basis for the Design Specifications.**