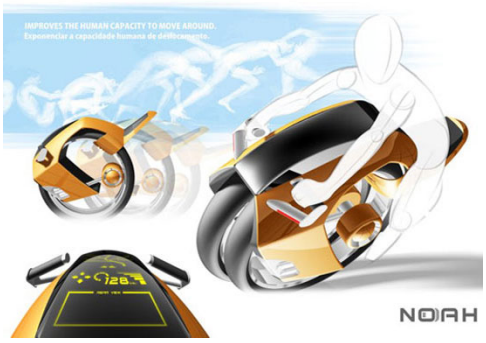
Industrial Models: A Futuristic Product

INTRODUCTION

Before manufacturing takes place, industrial designers make three-dimensional models of proposed products. These models help them to visualize and experiment with new ideas, as well as to communicate these ideas to others. In this activity, you will develop an idea for a futuristic product and construct a model of that product.

BACKGROUND

Industrial models are valuable assets for designers and engineers working to develop manufactured products. Models give engineers a way to analyze many possible solutions for a product, based on the relationships of function, form, material, and aesthetics. Industry also uses models to evaluate the ergonomics of a product's design. Ergonomics addresses the physiological and psychological aspects of how a consumer will use a product. Through the use of models, manufacturers can evaluate such factors as color, texture, size, and weight of a product before production begins. They can also use models to determine a product's impact on the environment. Models also serve a marketing function. Before marketing a finished product, manufacturers can use models in surveys of potential customers to get suggestions for improvements. In addition, through the use of a three-dimensional form of a designer's ideas people can best decide the various uses a product might have. Industrial models are also often used in advertising. Manufacturers publish photographs of models in technical journals to introduce a new product to potential customers. Models are created at three levels of complexity. The first level is called a paste-up. Designers construct paste-up models from simple materials, such as cardboard, clay, and Styrofoam®. Paste-ups provide a quick and very inexpensive way for engineers to visualize their ideas. The second type of model, the appearance mock-up is very accurate in terms of the size, color, and texture of the final product.



An appearance mockup looks as if it would actually function. However, the product does not contain any power elements and consequently will

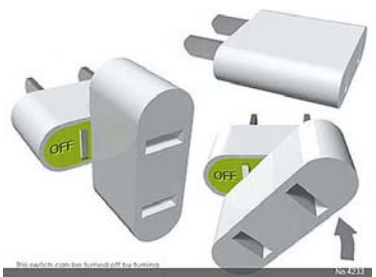
not operate. Manufacturers often use appearance mock-ups to select from many possible design ideas. They also use them for advertising a future product. The third level of model construction, the hard mock-up most accurately represents the product. This exact-size mock-up usually uses all the materials, colors, textures, and non-power components of the final product. The model is so realistic that it can often be used in consumer surveys to evaluate the appearance and the ergonomics of a product. Engineers often use hard models to begin planning production flow charts. Although hard mockups do not actually function, their high level of accuracy makes them expensive to produce. When creating industrial models, designers must choose a particular scale that will best represent their ideas. Paste-up models are simple and are not scaled. Appearance models and hard mock-ups may be based on a variety of scales. The scales of 1:24 and 1:1 are commonly used. Saying that a model is scaled 1:24 means that the full-size product would be 24 times larger. A model that has a 1:1 scale is the same size as the final product. To transform a model into a finished product, the manufacturer develops a prototype. A prototype is a full-scale, operational product. All of the components of the prototype will operate in a manner similar to those of the actual product. Prototypes are not mass-produced—in fact, all of their elements are often handmade. Prototypes are very expensive to develop. However, they have great value because they give engineers an opportunity to test and evaluate a product before mass production.

SAFETY

1. Wear eye protection when working with tools and materials.
2. Follow all of your teacher's safety precautions when using tools.
3. Follow particular safety instructions for use of small power hand tools for modeling purposes (e.g., portable drills and sanders).

CHALLENGE

Design a model of a futuristic product that a company might wish to manufacture.



LIMITATIONS

1. Your design must be original.

2. Your design must not rely on undiscovered future technologies. Use only currently available technology. For example, while you can use a laser, you cannot use a special particle beam that might, as an extreme example, transform elephants into tadpoles.
3. The model should be a hard mock-up. You should design major moving parts that actually move, while only simulating power elements. Your model will most likely not actually function.
4. Build the model at an appropriate scale. If the design is too big to create a model, you must have photo realistic sketches in three different views. (google sketchup/Solidworks)
5. Have your teacher approve your design, materials, and procedure before you construct a model. You may want to consider using some of the following materials for your model: clay; cardboard; acrylic; components from broken toys, calculators, or electronic games; expandable foams; woods; metals; or other materials approved by your teacher.

PROCEDURE

1. Examine products that you use every day (e.g., toaster, computer, microwave oven, CD player). Use brainstorming or other techniques to generate many ideas.
2. Think about ways in which you could improve these products. Your analysis should include how to improve the products in their function, their materials, or appearance. Select one of these products or another product idea that interests you.

3. On paper, list the ways in which you might improve the product you have selected. Using this list, develop possible design solutions to improve the product.
4. Select the best of the possible solutions. Make a sketch of your idea for this new design. Ask your teacher to review and approve your design.
5. Determine the size and scale for your model. (For example, Photo 1 shows two full-scale models, and Photo 2 shows a model of a talking tape measure that has a scale of 4:1.)
6. Make a list of materials that you can use to make the model. You may need to experiment with different materials. Ask your teacher to review and approve the materials list before you continue.
7. Write a list or sketch a flowchart of the steps you plan to follow in building the model. List the tools and equipment required. List any special materials, such as glue or contact paper that you may need. Have your teacher review and approve these lists.
8. Obtain the materials and begin making your model. Consult with your teacher about working with the materials.

9. During model construction, you may need to redesign components or change your materials list. If you do, consult with your teacher.
10. When your model is finished, prepare a two minute presentation using prezi.com to explain your new product idea to your class.

Examples

http://www.webdesignerdepot.com/2009/04/100-amazing-futuristic-design-concepts-w-wish-were-real/