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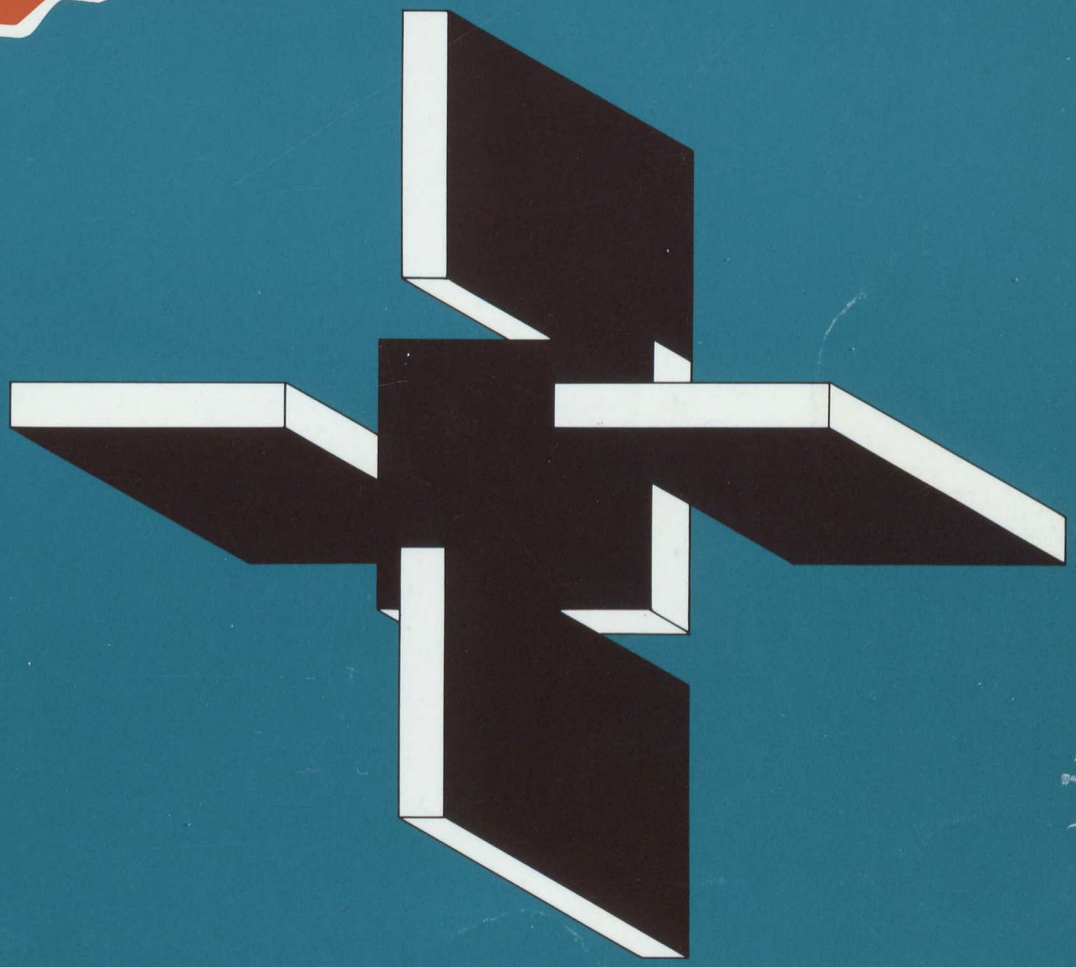
INDUSTRIAL DESIGN



Industry, Science and Technology Canada
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Canada

INDUSTRIAL DESIGN

Table of Contents

Preamble

To design something means to fashion it according to a plan. Many goods and services in our industrial economy are the result of design. Without design, the common paper clip would remain a purposeless piece of wire and the most sophisticated oil refinery would be nothing more than a collection of pipes.

While it is true that everything we produce is designed, it is equally true that not everything we produce is well designed. The fundamental test of design is the market-place; badly designed products do not sell.

Almost invariably, badly designed products are the outcome of management misunderstanding the nature of industrial design and the comprehensive role the industrial designer must play in the development of a product from its inception through to its marketing. The purpose of this booklet is to clear up that misunderstanding and explain what industrial design can do.

What Is Industrial Design?

Industrial design refers to the creative activity by which products are conceived for production on an industrial scale. The industrial designer must consider human characteristics and needs, safety, market appeal, efficiency in production, distribution, use and maintenance.

Industrial design requires a good working knowledge of engineering, familiarity with modern materials and a thorough understanding of production techniques. Since all products are meant to be sold, the industrial designer must also be familiar with marketing requirements and proficient in anticipating buyer needs and design trends.

The Market Situation

The pressures of competition and change, both in technology and consumer preferences, generate an endless cycle of new and improved products. One sure way to meet the challenge of those pressures is to make intelligent use of industrial design.

Competition in all markets for goods and services is fierce. The pattern of world trade, particularly as developing nations industrialize, indicates that Canadian goods will encounter increasingly stiff competition from foreign goods, both at home and abroad.

At the same time, powerful and unprecedented economic and social forces are at work in the market-place. Technology developments, more sophisticated production and marketing techniques, and shifting consumer preferences all combine to create a demand for new and improved products. No manufacturer can stand pat and expect to survive for long. The pace of change is rapid, incessant and ruthless.

In this situation, a product must satisfy the total needs of the user if it is to meet with success. It must measure up to certain standards of excellence in function, service, ease of use and maintenance, suitability, and appearance. Such products can only be produced by taking a creative and comprehensive approach to the whole product development cycle. That means incorporating industrial design into engineering, manufacturing, marketing and sales; it must be an integral part of the development process.

Unfortunately, many Canadian manufacturers fail to use that global approach to industrial design. Too often, it is regarded as an add-on, a luxury or frill, to be considered when most product concept decisions have been made and at a stage when little can be done to change basic engineering solutions. This cosmetic approach to design most often results in badly designed products that do not sell well.

Industrial Design: A Coordinated Activity

The development of a successful product depends on the integration of specialized creative talents and the leadership of top management. From the outset, the industrial designer should work with marketing and sales people, engineers, and manufacturing specialists to create the right product.

Once management has made the decision to use industrial design, a corporate policy on design should be established. Procedures should be laid down to ensure that the design policy is implemented effectively. A separate budget should be set up for industrial design rather than passing on design costs to the budget of some other department. Where a company manufactures a broad line of products, the cost of industrial design should be part of overall operation costs.

Close and continuing communication with management and other departments increases the designer's total value to the firm. To the extent possible, industrial designers should participate in the establishment of design goals and be closely involved in decisions on specific products. One important advantage of involving industrial designers in all phases of the design program is that they can visualize, in drawings or sketch models, the form that design decisions could take. Drawings or models can have a major bearing on decisions affecting engineering, materials and production techniques.

Once engineering development of the product has begun, many manufacturers make the mistake of removing the designer from any further contact with the project, especially when the designer is a consultant. However, during the process of translating the specifications into production and tooling drawings, even small changes may significantly alter the quality of the finished product. Many a well-designed product has rolled off the production line changed beyond recognition.

The industrial designer has, therefore, important contributions to make during the follow-through stages. Factors can arise during the manufacturing phases that require the designer's interpretation. In addition, many products will require improvements during their market lives as a result of advances in techniques and materials and pressures in the market-place brought about by competition and changing consumer preferences. An industrial designer fully familiar with all stages of the product's development is in the best position to anticipate such improvements and advise on the most economic way to make the necessary modifications.

The Design Process

Every design project is unique, with its own peculiar set of problems. Therefore, there is no set formula for all design solutions. The following outline illustrates the stages that **normally** take place. The process begins with management setting objectives. Management will have provided a memorandum containing all relevant information, including details of how the design program will be conducted and a list of the departments involved in the project.

Stage 1

- Statement of the Problem
  - Preparation of general design brief and statement of design problem.
  - Preparation of schedule, showing starting and completion targets for the various stages, including review sessions and market introduction.
  - Selection of the design team, both internal and external, and establishment of communication channels.

Stage 2

- Research Evaluation
  - Quantitative and qualitative research into markets, facilities, competitive features, options for manufacturing and materials, user prejudices and preferences, design trends, and retail costs.
  - Evaluation of management objectives in light of research results.
  - Preparation of specific performance specifications.
  - Preliminary drawings or models showing design potential.

Stage 3

- Preliminary Design
  - Preparation of engineering and industrial design concepts, complete with supporting material but not in specific detail.
  - Presentation of alternatives with an assessment of how each would meet the project objectives.
  - Review and assessment of concepts and possible revisions or additions to project objectives.

Stage 4

- Design Development
  - Preparation of specific information needed for value engineering, production engineering and cost evaluation.
  - Full review of all project details with the aim of product

improvement before committing the design to production.

- Preparation of models or working prototypes for market testing.

Stage 5

- Production Development
  - Preparation of complete specifications and guidelines for production engineering.
  - Preparation of production and tooling drawings.
  - Verification of all drawings and information before tooling begins.
  - Establishment of finish standards for component suppliers.
  - Creation of pre-production prototype.

Stage 6

- Production
  - Verification of the quality of the final product and its components.

Stage 7

- Follow-Through
  - Design of promotional material, if required.
  - Design of additional features or minor changes throughout the life of the product to respond to technical improvements and market-place changes.

The Role Of The Industrial Designer

The industrial designer has valuable contributions to offer throughout the decision-making process. The designer's role is to:

- help management visualize the final results of development and design;
- advise the product planning team on how existing products can be improved and new ones introduced;
- help the market research department assess the type of product performance characteristics required by consumers;
- establish visual characteristics that will give the sales team an edge in the market-place;
- help the engineering branch create a product that is economical, efficient and functional while ensuring that the ergonomic aspect or human needs are also addressed;
- help rationalize and simplify the manufacturing process to optimize capital investment and labour content while reducing the cost of parts; and
- contribute to the creation of promotional information and package design in ways that will improve distribution.

In particular, the industrial designer's function is to bring a sense of quality and value to a product that makes sophistication in engineering and manufacturing readily apparent. Designers concentrate their efforts on ensuring that a product is attractive and shows off its inherent qualities; that it is suited to the needs of the user; that it is convenient to use, safe and easy to maintain; that it can compete effectively with rival products; and that it complies with legal requirements.

Finally, industrial designers monitor new developments in materials, technology and manufacturing processes, as well as trends and developments on the international scene. By taking advantage of a designer's know-how, a company can gain an edge on the competition.

Selecting An Industrial Designer

Good industrial designers are naturally inquisitive. They tend to ask how things work and why they are done in a certain way. This trait can prove invaluable when it comes to questioning traditional attitudes and conventional solutions. Thus, it is not essential for a designer to have had experience with the particular line of products under discussion; a fresh approach can even be an asset.

Industrial designers are retained for their:

- qualifications and experience in designing for similar markets;
- knowledge of the manufacturing process and the materials involved;
- familiarity with the total design process;
- ability to communicate and co-operate with professionals in other disciplines; and
- fluency in expressing ideas in drawings and models.

Large companies anticipating a constant need for design advice should consider hiring a staff industrial designer. An in-house designer has the advantage of being well-versed in the manufacturing and marketing methods of the firm. Used correctly, a designer will make a major contribution to the success of a company's products. The designer will also be able to foresee areas where industrial design should play a part in product planning.

On the other hand, industrial design consultants are hired in much the same way as marketing consultants. A small firm might use consultants because its design needs are too irregular to retain a full-time designer on staff. A well-staffed industrial design firm can also be particularly useful where large quantities of work must be performed in a short period of time. Perhaps the most common reason for turning to an independent design consultant is that he or she will bring a fresh viewpoint to the project, along with a knowledge of other related areas and markets.

The Design Function And The Manufacturer's Needs

Whether a manufacturer hires an in-house designer or calls in a consultant, it is crucial to make sure the design function is tailored to the company's real needs. Firms using industrial design for the first time or re-examining existing design practice should seek expert advice in setting up an efficient design program. There are various ways industrial design can be applied to meet specific needs. Here are some typical projects:

- **Styling**
  - In many consumer manufacturing fields, design changes are simply changes in product style or appearance. The industrial designer's task here is to keep the product slightly ahead of its competition. The finely honed economics of these markets forces the designer to concentrate on rationalizing products and standardizing tooling and components while providing design variety in the product line. This requires close, day-to-day co-operation with the marketing, engineering, production and purchasing departments.

- **Product Redesign**
  - In some instances, products must be changed considerably to meet market-place pressures. In such cases, the industrial designer will be involved in basic design issues and will help determine both the physical characteristics of the redesigned product and the manner in which it is manufactured.

- **Product Innovation**
  - When a firm decides to diversify its production lines or create a new product, the industrial designer should be called in immediately after a business analysis has established the viability of the product. If a small or medium-sized company lacks the engineering staff and know-how needed to undertake a completely new project, many industrial design firms in Canada are structured to handle a complete product development program as consultants.

- **Engineering Products**
  - Some Canadian manufacturers of engineering products lag behind foreign competitors in the use of industrial design. Yet markets for specialized, highly technical products are expanding, and manufacturers should pay greater attention to appearance and function. The industrial designer's consideration of human needs and characteristics should contribute to

rendering these products more practical and attractive.

- **Promotional Design**
  - All the design efforts that go into developing new or improved products may be utterly wasted if the consumer never learns about them. Some industrial designers can advise on the design of packaging, sales displays, brochures and exhibitions to help sell the new product. The designer may also suggest that the firm update its entire corporate image when a new line of products is introduced.

In addition, industrial design consultants can provide valuable and time-saving services to companies by advising on person-machine and "whole-design" systems, by conducting preliminary evaluation and feasibility studies, by giving product-planning advice, and by setting up a corporate design policy.

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