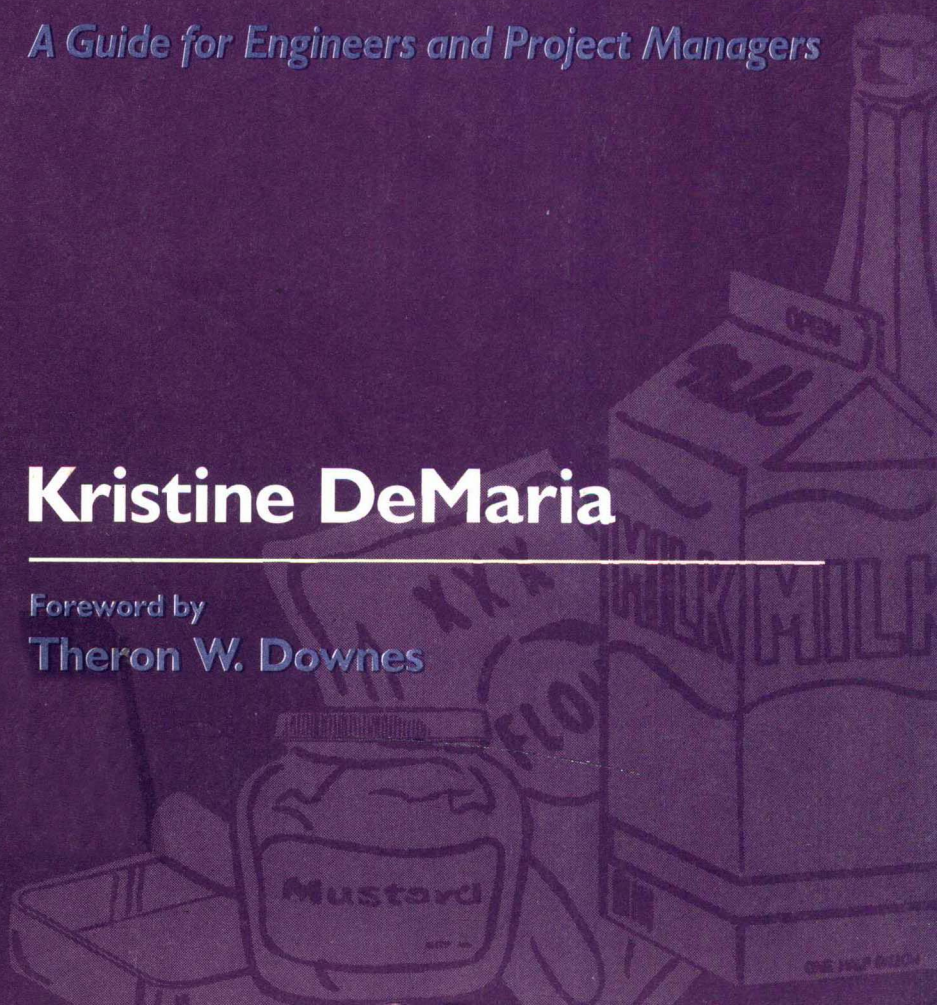# THE PACKAGING DEVELOPMENT PROCESS

A Guide for Engineers and Project Managers

Kristine DeMaria

Foreword by
Theron W. Downes

THE PACKAGING DEVELOPMENT PROCESS

A Guide for Engineers and Project Managers

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The Packaging Development Process

aTECHNOMIC®publication

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ONE OF THE measures of the maturity of a discipline is the availability
and usefulness of textbooks in that discipline for undergraduate educa-
tion. By that measure, packaging is still a young discipline but is matur-
ing rapidly. It is probably true that the first texts to appear in an emerg-
ing area of study will either be rather general in nature or quite specific
to those technical areas where much can be borrowed from existing dis-
ciplines. Good packaging texts exist for introductory courses and for
discussion of materials, properties, and fabrication. Some texts are also
available for specific areas such as food packaging and flexibles. It is
more difficult and takes longer to prepare texts that will integrate all of
the necessary underlying skills, technology, and knowledge for a cap-
stone course. We have been teaching a capstone course at the School of
Packaging at Michigan State University for more than 35 years. We de-
fine capstone as a project-oriented course in which students have a
chance to integrate and apply knowledge gained in earlier packaging
courses as well as from supporting disciplines such as physics, chemis-
try, business, marketing, advertising, finance, etc. We have been doing
this without a textbook, and at last a useful text has been produced.

The Packaging Development Process by Kristine DeMaria provides a
very useful compilation of experience, practical knowledge, and proce-
dural guidelines to make the student's journey from academia to the real
world a little easier and more productive.

One of the major difficulties in producing such a text is that there is no
single agreed upon approach to the product package system develop-
ment process and that further, the process to be followed will vary de-
pending on the complexity of the project being undertaken. The author
of this book does an admirable job of outlining the major steps in the

package development process and then uses three separate case studies to show how and when each of the techniques required should be applied. Starting with the planning phase and continuing through initiation, concept identification, feasibility assessment, consumer testing, and final evaluation, the case studies provide a framework for students' understanding of the myriad of possibilities for the real-world projects. The three case studies which are used include (1) a crisis reaction to improperly functioning components on a packaging line, (2) a long-term productivity improvement project, and (3) a search for a new packaging concept. Each varies with regard to its complexity, the size and nature of the team that is required to address the issues involved, the financial inputs that will be required, and the length of time needed to achieve results.

In each scenario each phase of the project is discussed with the required inputs. Attention is paid to planning, producing the proper team, situation analysis, etc. Techniques from related disciplines including project management, creativity problem solving, marketing, etc. are referred to but are not presented in detail here. This is quite acceptable as a number of very good references are already in the literature. By showing which of these techniques will be needed in each given project, students will gain a great deal from the business experience of the author. The discussion of proving functionality and final package launch will be a great benefit to many instructors who perhaps have not had personal experience at that phase of the activity themselves.

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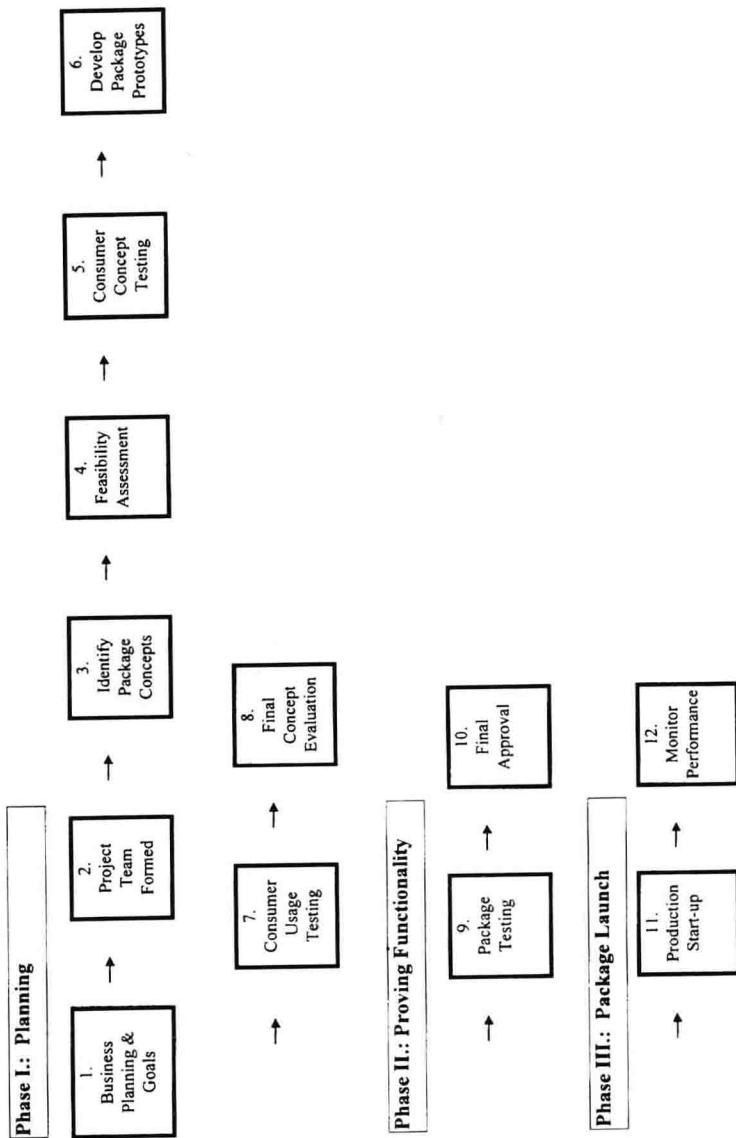*Michigan State University*

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HAVING THE KNOWLEDGE provided by *The Packaging Development Process* will give packaging professionals the information needed to complete packaging projects with a professional approach and high degree of business savvy. Early in a packaging engineer's career, impressions and perceptions are formed that will affect future career opportunities. Being technically sound is extremely important, but equally important to one's career is having the professional know-how and an innovative approach that provides confidence and wins respect from managers and co-workers.

Packaging projects can vary greatly in complexity. Some projects will be quite simple while others will demand a lot of planning, research, testing and modifying and may take two to three years before the package is ready to be produced and marketed. *The Packaging Development Process* breaks a project into actionable steps, making an overwhelming workload manageable. Taking a logical approach to project work diminishes the probability of overlooking a task or a potential problem.

The steps for completing a packaging project are explained in the following chapters and are depicted in a flowchart on the following page. Some of the steps will not be necessary for every project. A project to modify a corrugated shipper for increased strength will use only a few of the steps, whereas introduction of an all new package may use all of the steps.

The people involved in a project and internal company policies are organization specific, but generally, certain steps are taken when working on a packaging project. For instance, the package graphics may be the packaging engineer's responsibility in one company but a separate de-

Packaging Development Process Flowchart

Phase I.: Planning

1. Business Planning & Goals → 2. Project Team Formed → 3. Identify Package Concepts → 4. Feasibility Assessment → 5. Consumer Concept Testing → 6. Develop Package Prototypes

→ 7. Consumer Usage Testing → 8. Final Concept Evaluation

Phase II.: Proving Functionality

→ 9. Package Testing → 10. Final Approval

Phase III.: Package Launch

→ 11. Production Start-up → 12. Monitor Performance

partment's in another. If a new piece of equipment is necessary, the packaging engineer may be required to source, qualify, and purchase it, or he/she may need to work with a separate engineering group that handles the details of buying all equipment.

The larger and more departmentalized a company, the more formal the methods of communication and decision making tend to be. Written communication is often the norm in a large company, whereas verbal discussions and decisions may be quite acceptable for smaller companies. Project pace also tends to be slower and risk acceptance lower in larger, more established organizations. Whatever the organizational culture, the steps and thought processes required to develop a package are similar.

Project Initiation

BUSINESS PLANNING AND GOAL SETTING

PLANNING AND GOAL generation provide direction and vision for an organization. Business planning for many companies is an annual event that takes months to complete. Goal generation requires input from all departments, and goals are often written and rewritten before approval. The packaging department should provide input for all packaging-specific goals. Once completed, the goals are documented and distributed to those pertinent in the organization. The personality of an organization will dictate whether goals are to be strictly adhered to or if they are targets to strive for. It is wise to have a good understanding of accountability prior to submitting goals.

PROJECT TEAMS

Project teams are composed of people from the cross-functional areas needed to complete all the tasks required for a project. A team will have core members who must participate continuously for the project to thrive and secondary members who will come and go as their services are required. Sometimes packaging suppliers are viewed as secondary members on a project team.

A team needs a leader, and on packaging-focused projects, the leader is usually a packaging engineer. The packaging engineer may not be the most experienced member of the team, but it will be the engineer's responsibility to manage the team and the project. Successful teams are

focused with team members agreeing to do their share of project responsibilities.

Project Charter

Creating a project charter is a good planning process that enables the team to focus and think through the tasks that must be done to complete a project. In the process of writing a charter, the team provides the business need that justifies doing the project and outlines all factors relating to the project's completion. Writing a charter can be a time-consuming and difficult process, and one that many would like to skip in order to begin working on project tasks. The process is worth the effort because without thoughtful planning much time and energy will be wasted. The format for a project charter is provided in Figure 1.1.

Situation Analysis

The marketing and packaging team members often develop the situation analysis together. Marketing will contribute the financial and market purposes for the packaging project, and packaging will provide information on the technical need. A good situation analysis will help the team understand the importance of the project and prioritize it in comparison to others. Factual information will make the analysis more meaningful. If the project is quality oriented, state the extent of the problem numerically. Instead of writing, "extensive damage is occurring during shipment," determine the details of the damage. A more meaningful statement would be, "On an annual basis, 33% of all product experiences damage during shipment resulting in $1 MM worth of damaged product." A thorough situation analysis may also uncover reasons to prevent a project from proceeding, thus saving time and money.

Critical Success Factors

Critical success factors are the criteria that must be met in order for the project to meet the stated goal. These factors are determined at the initiation of a project and will not change unless the project goal changes.

(Project Name) Charter

Project Goal: Describe the purpose and objective for the project.

Situation Analysis: Describe the current technical and marketing reasons that justify the project.

Critical Success Factors: Determine which critical factors must be successfully completed in order for the project to meet the project goal.

Milestones: Provide the time and events schedule for all tasks required for project completion. Assign responsibility for all tasks.

Assumptions and Risks: List any assumptions that are being made and any risks that there may be in proceeding with the project. State any risks there are in not doing the project.

Team Members and Roles: List all team members and their roles on the team.

Team Rules: Document all agreed upon team rules such as meeting attendance, communication processes, etc.

Figure 1.1. Team charter format.

Project Timelines

Input and agreement from the entire project team is necessary on project timelines. A project timeline is a detailed schedule of all the events that must be completed for the project. There will be a series of critical events in the timeline. Without the completion of a critical event, the project cannot move forward. If a critical event is delayed, the entire project is delayed. Critical events should be highlighted to keep the team focused on them. As team leader, the packaging engineer is the keeper of the timeline. Keeping a project on schedule can be difficult. Assigning responsibility and following up with team members on the critical events can help keep the project on schedule. A good team rule is to require that project delays be reported to the team leader as soon as they are known.

When a project is new, the specific plan for the package may not yet be determined. The timeline may be somewhat vague at this point with only some major milestones listed. Once the team is focused on a specific package idea, a very detailed timeline can be established. Realistic, conservative time frames should be used, possibly even adding in a little buffer just to be safe. If the film printing process takes six to eight weeks, eight weeks should be stated on the timeline. It is better to finish on time than to be constantly explaining why the timeline is being extended. Management often feels a timeline is too long. Having solid reasons for the stated dates will help alleviate those feelings.

Project timelines can be shortened as long as the risk associated with doing so is understood and acceptable. Testing can be eliminated or one concept can be pursued rather than evaluating several, but the risk of such decisions should be well documented and communicated. Certain situations, particularly if the company is in a defensive position, may warrant taking risks in order to enter a new package into the market quickly.

The timeline is to be documented as part of the team charter, but since it will be the portion of the charter most utilized, it is a good idea to make a separate document of just the timeline for easy access. The timeline will often have to be revised as events happen and new information is learned during the course of the project. There are several formats that can be used for a timeline. The events can be shown in a table with columns listing tasks, timing, and responsibility (Table 1.1). This format is particularly convenient for projects that have a great number

Table 1.1. *Timeline in Table Format.*

Task	Timing	Responsibility
Idea Generation:		
team field trip	2/28	Mary
conduct brainstorm meeting	3/1	Mary
supplier brainstorm meeting	3/3	Mary/Jim
select concepts to research	3/8	Team
Feasibility Assessment:		
supplier discussion	3/9–3/24	Mary
plant trip	3/16	Mary, Doug
lab tests	3/10–5/1	Mary
quotes obtained	4/20	Mary
team meeting/ideas selected	5/1	Team
Consumer Testing:		
concept boards created	6/1	Gary
test fielded	6/4	Gary

of tasks that will take a very long time to complete. For clarity, it helps to segment the timeline into the various phases of the project.

Events can also be displayed to show the progression of the events over time (Table 1.2). This format is good for showing the cause and effect of the various events, but it may be cumbersome in size if the timeline stretches over a two- or three-year time period. Note that italic type is used for one of the tasks to indicate that it is a critical event.

Team Meetings

Meetings are effective tools for communicating and decision making. They can also be time wasters. Meetings that have purpose and are well

Table 1.2. *Timeline Visually Depicting the Progression of Time.*

Task	Timing					Respon-sibility
	June	July	Aug.	Sept.	Oct.	
Proving Functionality:						
Production trial	6/15					Mary
pallet ship test	⊢——⊣					Mary
physical testing	⊢————————————⊣					Mary
consumer use testing	⊢————————⊣					Bob
final concept selected				9/18		Team