

New Product Introduction

based on

Stage-Gate Product Lifecycle Management

Concepts and Processes



New Product Introduction Process

Disciplined approach to enable;

- Commercial opportunity qualification
- Engineering resource application
- Introduction to manufacturing
- Product launch

Goals

- Ask and answer all the right questions
- Gain total organizational support
- Move at the appropriate pace
- Provide a positive customer experience



Process Highlights

- Standardized terms and definitions
- Five stages and gates
- Five project/product development types
- Three product phases
- Team member roles and responsibilities
- Individual deliverables
- Best practices
- Speed is determined by
 - Quality and timeliness of inputs
 - Project types
 - Strategic fit to the business

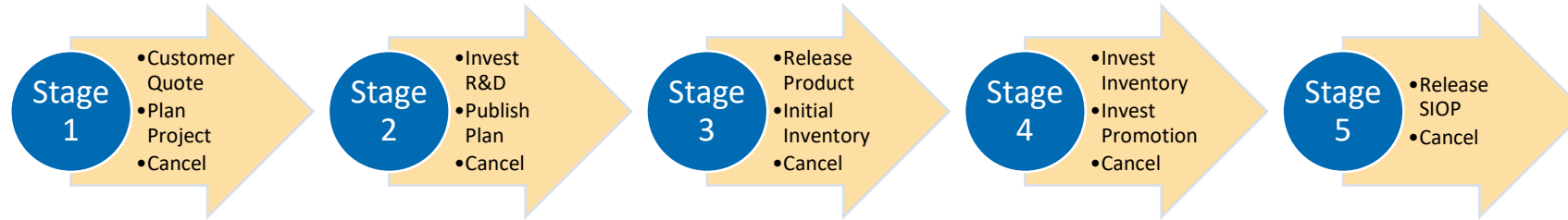


Establish Clear Meaning of Terms

- Encourages common understanding throughout the organization
- Fosters clear and crisp communication among team members
- Focus efforts quickly and effectively

- Examples
 - DCD – Design Concept Document (Theory of Operation)
 - ERD – Engineering Requirements Document
 - PFD – Process Flow Diagram
 - ASD – Assembly Drawing
 - LBL – Label Drawing

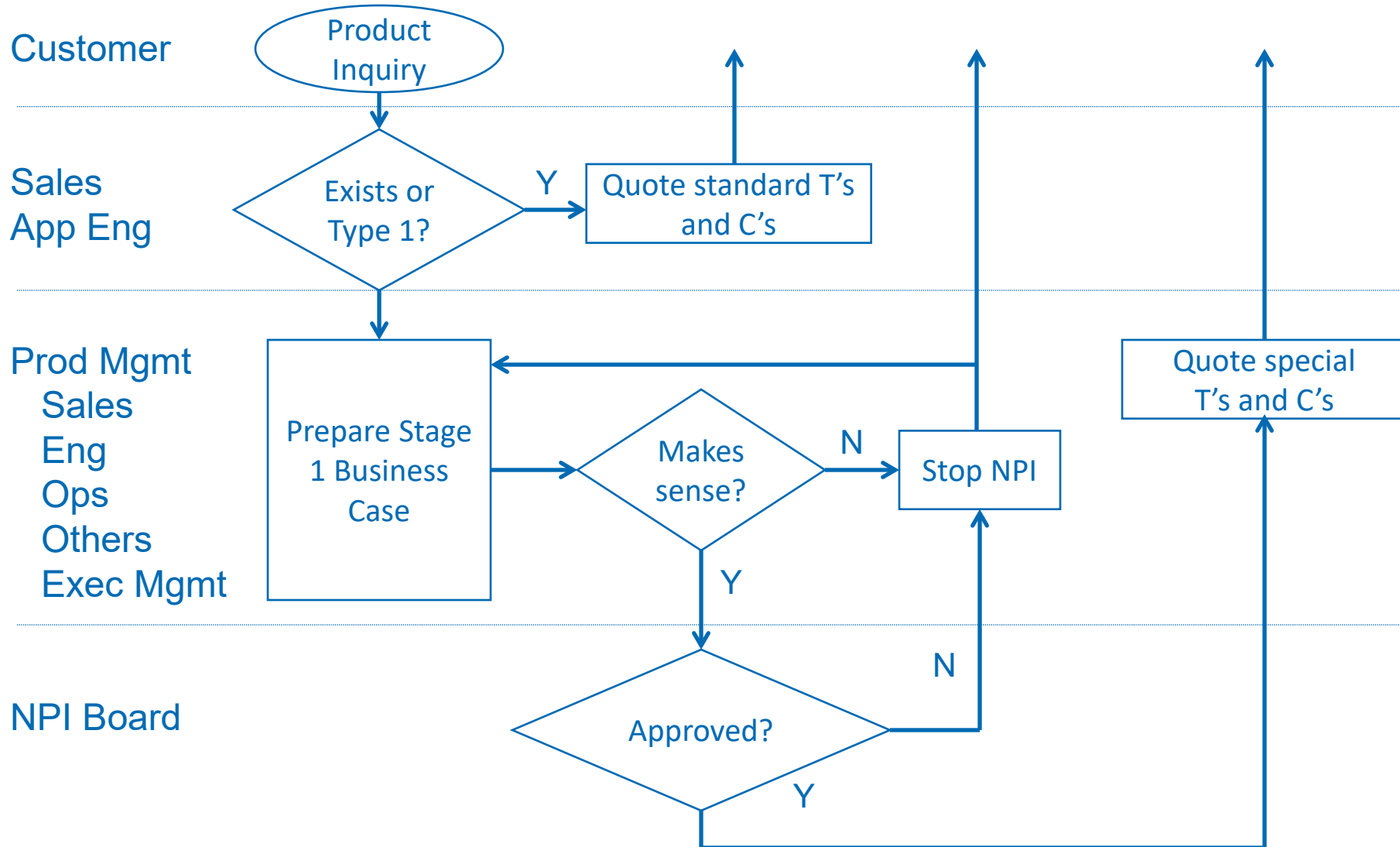
Stages-Gates



STAGE		GATE Decision
1	Opportunity Scoping	Proceed to plan the project Customer Quote
2	Project Planning	Publish plan and schedule Invest R&D
3	Product Development	Product release to manufacturing Purchase initial inventory
4	Product Implementation	Buildup Inventory Invest in Market Promotional Activities
5	Commercial Launch	Release to SIOP



Stage 1 Opportunity Qualification Process Flow





Project/Product Development Types

Project Type	General Description	Description	Resource and Timing Expectations
1	New Configuration	A new combination of existing components or subsystems that has not been combined before. Requires product release documentation changes only.	Should be handled on sales order as much as possible. May require BOM, MTR, WI changes. 1-3 days to release.
2	New Item - not agency affecting	New configuration option sub-assembly, component, S/W feature, bus bar, harness, etc. - that does not affect any agency certification. Results in a new standard option within the system platform.	New BOM, MTR, WI, ASD. Minimal DVT and SIT. 4 weeks to release.
3	New Item - agency affecting	New configuration option that must be agency re-certified. A subset of DVT and SIT is required, both H/W and S/W. Results in a new standard option within the system platform.	New BOM, MTR, WI, ASD, DVT and SIT report. 4-12 weeks to release.
4	New Platform or "Custom"	A new system product based on new H/W or S/W products and technologies such that a different customer value proposition is created or a new application space is addressed. Many configuration options and derivations are anticipated. Full blown DVT and SIT and agency certifications are required.	Complete new design and product release package. 8-18 months to release.
5	New Technology	Classic pre-development research. Development required to test and validate new components, circuits, structures, materials, etc. and validate their general applicability to enhance product lines and business results.	Classic pre-development research. 4-60 months.

Hardware "Example"	Component "Computer Mother Board"	System "Uninterruptible Power Supply"
Platform Attributes	Printed Wiring Board Layout	Delivered Power Rating
	Component Set	Power Quality Type
	Circuit Topology	Battery/Energy Reserve
	Packaging and Thermal Management	Packaging and Thermal Management
	External I/O Connections	Control and Communication Functions
	Embedded Software	Power Conversion Modules

- Defines effort and activity
- Sets expectations
- Guides product positioning



Product Phases

Phase	Description	Intended Purpose	Level of Compliance
Prototype	Engineering built product. Multiple iterations of Prototypes may be created depending on product complexity.	Consumables used to develop, characterize, and qualify the product design. Not yet under change control. May be provided to customers for product acquaintance.	None. Partial compliance or anticipated compliance at best.
First Article	First production built units. Utilizes all factory and supplier automation, tooling, processes, etc. First Article builds should be highly visible events and attract much attention.	Validate design transfer and production processes. Under strict change control. Pending successful First Article build, resulting units may be put in inventory and sold as Production products with full agency compliance and warranty. Second, third, etc. article builds may be necessary but are undesirable.	Full with every agency complete.
Production	Fully released product. Normal production and business processes are functioning without extraordinary effort.	Business as usual sales - fully backed by warranty.	Full with every agency complete.

- Distinct and clear meaning shared by various constituencies
- Drives common understanding and behavior



Roles and Responsibilities

Job Function	Role	Responsibility
Product Manager	General stewardship of product line	Liaison between customer/sales and engineering/operations. Manage product expectations, margins, and competitiveness.
Program Manager	Manage cross-functional team activities of end-to-end Stage/Gate process	Delivery of new product through the stage/gate process. Lead and manage end-to-end team activities and interactions. Foster co-operation among team members. Attainment of all program deliverables; on time and budget.
Project Manager	Manage product design & qualification activities	Lead and Manage overall design integrity, performance, and qualification activities. Attainment of all project deliverables - quality, cost, and schedule. Co-ordination of activities among various design team members.
Marketing Manager	Determination of product need and promotion of products into market	Overall market assessment of product need/application/fit, and total economic potential
Design Engineer	Perform all product design and development activities	Design integrity, performance, and qualification. Attainment of all project deliverables - quality, cost, and schedule.
Supply Chain Engineer	Evaluate and recommend purchased components, materials, and suppliers	Purchased component/material integrity, performance, and qualification. Attainment of all project deliverables
Safety Engineer	Manage agency test and evaluation	Liaison between design team and certification agencies. Attainment of agency certification on time and on budget.
Scheduler	Creates and manages first article and production build schedules	Accuracy and timeliness of all shop floor schedules according to material availability, capacity, and capability analysis. Attainment of all project deliverables.
Manufacturing Engineer	Develop manufacturing capability and process	Integrity, performance, and qualification of all assembly aids, fixtures, processes, instructions, etc. Attainment of all project deliverables.

Clear lines of responsibility, accountability, and deliverables



Best Practices

- Concurrent Design
- Front End Activities
- Engaged Management, Visibility, and Transparency
- Guiding Principles and Criteria
- Unemotional Financial Analysis
- First Article Event Status
- Metrics