CHAPTER 17 PROCESS COSTING SYSTEMS Online PDF

Chapter 17 process costing systems is a vital topic within managerial and cost accounting, focusing on the methods used to allocate costs in industries where products are manufactured through continuous processes. Understanding the intricacies of process costing systems is essential for businesses involved in mass production, such as chemicals, textiles, food processing, and petroleum refining. This article explores the fundamental concepts, processes, and applications of process costing, providing a comprehensive overview suitable for students, professionals, and business owners.

Introduction to Process Costing Systems

Process costing is a cost accumulation method used when identical or similar products are produced continuously over a period of time. Unlike job costing, which tracks costs for individual jobs or batches, process costing assigns average costs to units produced during a specific period.

Key Characteristics of Process Costing

- Mass production of homogeneous products
- Continuous or repetitive manufacturing processes
- Accumulation of costs over a specific period
- Calculating average cost per unit

Types of Process Costing Systems

Different industries and companies may adopt variations of process costing depending on their operational needs.

1. Weighted-Average Method

This method combines costs and units from the current and previous periods to calculate an average cost per unit. It simplifies accounting by blending beginning inventory costs with current period costs.

2. FIFO (First-In, First-Out) Method

FIFO treats beginning inventory costs separately from current costs, assigning costs based on the actual flow of units. It provides more accurate cost information, especially when costs fluctuate significantly.

Understanding the Process Costing Procedure

Implementing process costing involves several systematic steps:

1. Summarize the Production Data

Gather data on:

- Units in beginning inventory
- Units started during the period
- Units completed and transferred out
- Units in ending inventory

2. Calculate Equivalent Units

Since ending inventory may not be fully complete, equivalent units convert partially completed units into full units for cost allocation.

3. Determine the Cost per Equivalent Unit

Compute by dividing total costs (materials, labor, manufacturing overhead) by the equivalent units.

4. Assign Costs to Completed and In-Progress Units

Using the calculated cost per equivalent unit, allocate costs to units finished and those remaining in inventory.

Accounting for Process Costing

Process costing involves detailed journal entries and cost flows.

Key Accounts Involved

- Work in Process Inventory
- Raw Materials Inventory

- Manufacturing Overhead
- Cost of Goods Sold (COGS)

Typical Journal Entries

- To record raw materials used:
- Debit Work in Process Inventory
- Credit Raw Materials Inventory
- To record direct labor and overhead:
- Debit Work in Process Inventory
- Credit Wages Payable / Overhead Control
- To transfer completed units to finished goods:
- Debit Finished Goods Inventory
- Credit Work in Process Inventory

Cost Control and Variance Analysis

Effective process costing requires monitoring and controlling costs through variance analysis.

Types of Variances

- Materials Price and Usage Variances
- Labor Rate and Efficiency Variances
- Overhead Variances (Spending and Efficiency)

Analyzing these variances helps managers identify areas where costs deviate from standards, enabling corrective actions to improve efficiency and profitability.

Advantages and Disadvantages of Process Costing

Advantages

- Suitable for high-volume, homogeneous products
- Simplifies cost accumulation and valuation
- Provides consistent and comparable unit costs

Disadvantages

- Less useful for customized or batch production
- Potential inaccuracies if production processes are complex
- Requires detailed record-keeping for equivalent units

Applications of Process Costing

Process costing is used across various industries where continuous production is the norm:

- Chemical manufacturing
- Food and beverage processing
- Textile production
- Pulp and paper industry
- Petroleum refining

Challenges in Process Costing

While process costing offers many benefits, it also presents specific challenges:

- Accurately allocating costs during process changes or disruptions
- Handling spoilage, waste, and rework costs
- Managing inventory valuation amidst fluctuating costs
- Maintaining detailed records for equivalent units and cost calculations

Conclusion

Understanding process costing systems is fundamental for managing manufacturing costs efficiently in industries characterized by continuous, homogeneous production processes. Whether employing the weighted-average method or FIFO, companies must diligently track production data, calculate equivalent units, and allocate costs accurately. Proper implementation of process costing not only ensures precise cost control but also enhances decision-making related to pricing, budgeting, and financial reporting. As manufacturing environments evolve, mastering the principles of process costing remains essential for maintaining competitive advantage and operational efficiency.

Chapter 17: Process Costing Systems offers a comprehensive exploration of one of the fundamental methods used in manufacturing and production environments to allocate costs efficiently and accurately. This chapter delves into the principles, procedures, and applications of process costing, providing vital insights for students, accountants, and manufacturing managers alike. As industries increasingly adopt continuous production processes, understanding process costing becomes essential for proper cost management, financial reporting, and decision-making.

Introduction to Process Costing

Process costing is a costing method used primarily in industries where large volumes of similar or identical products are manufactured through a series of continuous processes. Unlike job-order costing, which tracks costs for specific jobs or orders, process costing accumulates costs by departments or processes over a period, then averages these costs over the units produced.

Key Features:

- Suitable for industries such as chemicals, oil refining, textiles, food processing, and pharmaceuticals.
- Costs are accumulated by department or process rather than individual units.
- The method simplifies the costing process when products are homogeneous.

Advantages of Process Costing:

- Streamlined cost accumulation due to uniform products.
- Facilitates cost control and performance evaluation within processes.
- Suitable for high-volume, low-margin production environments.

Limitations:

- Less precise for customized or varied products.
- Difficult to assign costs accurately when processes involve significant variability.
- Not ideal for industries with many different products or complex manufacturing processes.

Fundamental Concepts of Process Costing

Understanding process costing requires grasping several core concepts:

Equivalent Units of Production

Since products are often incomplete at the end of a period, costs are allocated based on the concept of equivalent units?units that could have been completed given the amount of work done.

Features:

- Accounts for partially completed units.
- Calculated separately for materials, labor, and overhead.
- Essential for accurate cost allocation.

Cost Flows and Account Structure

Process costing involves tracking costs through various accounts and stages:

- Raw Materials Inventory: Costs of materials purchased.
- Work in Process (WIP): Costs accumulated for incomplete units.
- Finished Goods Inventory: Completed units transferred out.
- Production Cost Reports: Summarize costs and units processed.

Cost Allocation Methods

Common methods include:

- Weighted-Average Method: Combines costs of beginning WIP and current period costs, averaging over units worked on.
- First-In, First-Out (FIFO) Method: Separates beginning WIP from current period production, providing more precise cost control.

Process Costing Procedures

Implementing process costing entails a systematic approach:

Step 1: Summarize the Production Data

Collect data on units started, completed, and remaining in process.

Step 2: Calculate Equivalent Units

Determine the number of equivalent units for materials, labor, and overhead.

Step 3: Compute Costs per Equivalent Unit

Divide total costs (including beginning WIP costs and current period costs) by equivalent units to get per-unit costs.

Step 4: Assign Costs to Completed and Ending WIP

Allocate costs based on the equivalent units, determining the value of units transferred out and units remaining in ending WIP.

Step 5: Prepare Production Cost Reports

Summarize the data, providing management with detailed information on costs and production efficiency.

Types of Process Costing Systems

Different systems adapt to specific operational needs:

Weighted-Average Method

- Combines beginning WIP costs with current period costs.
- Simplifies calculations, especially when WIP inventory is significant.
- Less sensitive to changes in costs over time.
- Suitable when production is continuous and homogeneous.

FIFO Method

- Separates beginning inventory costs from current production costs.
- Provides more accurate cost control and profitability analysis.
- Better reflects cost flows when there are significant changes in costs or WIP levels.
- Slightly more complex to implement.

Handling Costs in Process Costing

Cost management in process costing involves various considerations:

Materials

- Typically added at the beginning of the process.
- For some processes, materials may be added at various stages.

Labor

- Usually incurred uniformly throughout the process.
- Cost allocation based on labor hours or machine hours.

Manufacturing Overhead

- Includes indirect costs like utilities, depreciation, and maintenance.
- Allocated based on a predetermined rate, often using labor hours or machine hours as the base.

Advantages and Disadvantages of Process Costing Systems

Pros:

- Efficient for high-volume, homogeneous production.
- Simplifies cost tracking across multiple processes.
- Facilitates standard costing and variance analysis.
- Supports accurate inventory valuation and financial reporting.

Cons:

- Less accurate for customized products.
- Difficult to assign costs accurately when processes are complex or involve significant variability.
- Does not easily accommodate product diversity or customization.
- Potential for cost distortion if process inefficiencies are not identified.

Applications and Examples of Process Costing

Example Scenario: Oil Refinery

In an oil refinery, crude oil passes through several processes?distillation, cracking, and blending. Costs are accumulated at each stage, and product costs are calculated based on the equivalent units of crude processed, factoring in losses and waste.

Example Scenario: Textile Manufacturing

A textile mill processes fabric through dyeing, finishing, and quality inspection. The costs associated with each department are tracked, and the total costs are allocated to units based on equivalent units.

In both examples, process costing provides a clear framework for cost control and valuation, ensuring management can make informed decisions.

Cost Control and Decision-Making Using Process Costing

Effective use of process costing enables management to:

- Monitor process efficiencies.
- Identify variances between expected and actual costs.
- Make pricing decisions based on accurate cost data.
- Optimize production processes to reduce waste and improve throughput.
- Evaluate departmental performance.

Challenges in Implementing Process Costing Systems

While process costing offers many advantages, it also presents challenges:

- Accurate calculation of equivalent units can be complex.
- Overhead allocation requires precise estimation of predetermined rates.
- Handling spoilage, waste, and rework involves additional calculations.
- Maintaining detailed records across multiple processes demands robust systems.

Conclusion and Final Thoughts

Chapter 17 on process costing systems provides essential knowledge for understanding how manufacturers allocate costs in a high-volume, repetitive production environment. Its systematic approach to cost accumulation and allocation ensures accurate product costing, inventory valuation, and cost control. While the simplicity and efficiency of process costing make it ideal for many industries, it also requires careful implementation to avoid inaccuracies, especially when dealing with waste, spoilage, or process variability.

The choice between weighted-average and FIFO methods depends on the company's needs for precision versus simplicity. Ultimately, mastering process costing equips managers and accountants with the tools necessary to analyze production costs effectively, make strategic decisions, and maintain competitive advantage in manufacturing sectors.

By understanding the nuances, benefits, and limitations of process costing, organizations can better manage their production processes, control costs, and improve financial reporting, ensuring sustainability and profitability in competitive markets.

QuestionAnswer What are the main features of a process costing system? A process costing system accumulates costs by department or process for homogeneous products, assigning costs evenly across units produced, making it suitable for industries like chemicals, textiles, and food production. How does a company determine equivalent units in process costing? Equivalent units are calculated to measure the amount of work done during a period, converting partially completed units into a number of fully completed units based on the degree of completion for materials, labor, and overhead. What is the purpose of a production cost report in process costing? The production cost report summarizes the costs incurred, units processed, and costs assigned to units completed and ending work-in-progress, serving as a key tool for cost control and financial reporting. How are costs assigned to units in a process costing system? Costs are assigned by calculating the cost per equivalent unit for materials, labor, and overhead, then multiplying these rates by the number of equivalent units for each category. What is the difference between weighted-average and FIFO methods in process costing? The weighted-average method combines costs and units from current and prior periods, averaging costs, while FIFO separates the costs of beginning inventory from current period costs, providing different insights into production costs. How is spoilage handled in process costing systems? Spoilage costs are identified and assigned to the units affected, either as a normal cost of production included in unit costs or as a separate loss, depending on whether spoilage is considered normal or abnormal. What role do equivalent units play in cost allocation? Equivalent units allow for accurate cost allocation by converting partially completed units into a common measure, ensuring costs are appropriately assigned to both completed and ending work-in-progress units. How do companies reconcile the costs in process costing with financial statements? Companies reconcile costs by ensuring that the total costs accounted for (costs assigned to units completed and ending WIP) match the total costs incurred during the period, facilitating accurate financial reporting. What are common challenges faced in implementing process costing systems? Challenges include accurately allocating overhead, handling spoilage and rework, managing complex production flows, and ensuring consistent calculation of equivalent units, all of which require careful analysis and control.

Related keywords: process costing, cost accumulation, production report, equivalent units, departmental costs, journal entries, cost flow, inventory valuation, cost reconciliation, work-in-process

Process Design Glossary

Process design glossary is an essential resource for professionals involved in optimizing and developing efficient workflows, manufacturing systems, and business processes. Whether you are a process engineer, operations manager, or a student entering the field, understanding the

fundamental terminology and concepts is crucial for effective communication and successful implementation. This comprehensive guide aims to provide a detailed overview of key process design terms, definitions, and concepts to help you navigate the complex language of process improvement and innovation.

Understanding Process Design

Process design is the discipline of planning and creating procedures and workflows that transform inputs into desired outputs efficiently and effectively. It involves analyzing existing processes, identifying bottlenecks, and developing new methods to enhance productivity, quality, and flexibility.

What is a Process?

A process is a series of structured activities or steps that convert inputs (materials, information, or resources) into outputs (products, services, or results). Processes can be simple or complex, manual or automated, and are fundamental to all operational activities.

Key Goals of Process Design

- Increase efficiency and reduce waste
- Improve quality and consistency
- Enhance flexibility and responsiveness
- Reduce costs and cycle times
- Ensure compliance and safety

Core Terms in Process Design Glossary

Understanding the language of process design involves familiarizing oneself with a variety of specific terms and concepts. Below are some of the most important words and phrases used in the field.

Process Map

A visual representation of a process, illustrating each step, decision point, and flow of materials or information. Process maps are vital for analyzing current workflows and designing improvements.

Process Flowchart

Similar to a process map, a flowchart specifically uses standardized symbols to depict the sequence of activities, decision points, and flow direction within a process.

Value-Added and Non-Value-Added Activities

- Value-Added Activities: Steps that directly contribute to meeting customer requirements.
- Non-Value-Added Activities: Steps that do not add value and are often targeted for elimination or reduction.

Process Optimization

The systematic approach to improving process performance by reducing waste, increasing throughput, and enhancing quality.

Lean Manufacturing

A methodology focused on minimizing waste ("muda") while maximizing value to the customer. It emphasizes continuous improvement, just-in-time production, and waste elimination.

Six Sigma

A data-driven approach aimed at reducing variability and defects in processes, leading to higher quality outputs.

Process Capacity

The maximum output a process can achieve within a given period under specified conditions.

Cycle Time

The total time required to complete one cycle of a process, from start to finish.

Throughput

The amount of output produced by a process within a specified period.

Bottleneck

The stage in a process that limits overall capacity and causes delays.

Workload Balance

Distributing tasks evenly across resources to avoid overburdening some while others are

underutilized.

Process Reengineering

A radical redesign of core business processes to achieve dramatic improvements in critical measures such as cost, quality, and speed.

Standard Operating Procedures (SOPs)

Documented instructions that describe how to perform specific tasks consistently and effectively.

Process Design Methodologies

Different approaches and frameworks exist for designing and improving processes. Familiarity with these methodologies can enhance your process design glossary understanding.

Business Process Modeling (BPM)

A systematic approach to representing processes visually, often using BPMN (Business Process Model and Notation) standards, to facilitate analysis and improvement.

Kaizen

A Japanese philosophy emphasizing continuous, incremental improvements involving all employees.

PDCA Cycle (Plan-Do-Check-Act)

A repetitive four-step model for continuous process improvement.

Value Stream Mapping

A Lean tool that visualizes the flow of materials and information to identify waste and areas for improvement.

Key Metrics and Indicators in Process Design

Effective process design relies heavily on measuring performance. Here are some critical metrics:

- **Lead Time:** Total time from order initiation to delivery.

- **Process Cycle Efficiency (PCE):** Ratio of value-added time to total cycle time.
- **Defect Rate:** Percentage of outputs that fail to meet quality standards.
- **Overall Equipment Effectiveness (OEE):** Measure of how well manufacturing equipment performs.
- **First Pass Yield (FPY):** Percentage of products passing quality inspection without rework.

Tools and Techniques in Process Design

A variety of tools assist in analyzing and improving processes. Understanding these tools is essential for effective process design.

Cause-and-Effect Diagram (Fishbone Diagram)

Helps identify root causes of problems or defects.

Pareto Analysis

Prioritizes issues based on their frequency or impact, following the 80/20 rule.

Histogram

Displays data distribution to identify variability and patterns.

Control Charts

Monitors process stability over time to detect deviations.

SWOT Analysis

Evaluates strengths, weaknesses, opportunities, and threats related to a process.

Common Process Design Challenges and Solutions

Understanding typical challenges helps in developing effective strategies for process improvement.

Challenges

- Identifying waste and inefficiencies
- Managing variability
- Ensuring compliance with standards

- Integrating new technologies
- Balancing capacity and demand

Solutions

- Implementing Lean and Six Sigma methodologies
- Using process mapping and modeling
- Engaging employees in continuous improvement
- Automating repetitive tasks
- Monitoring key performance indicators (KPIs)

The Importance of a Process Design Glossary

Having a clear and comprehensive process design glossary ensures that all stakeholders speak a common language. This shared understanding minimizes miscommunication, accelerates project timelines, and improves overall process outcomes. It also serves as a valuable training resource for new team members and supports documentation efforts.

Conclusion

Mastering the process design glossary is fundamental for professionals aiming to optimize operations, enhance efficiency, and deliver high-quality results. By familiarizing yourself with key terms, methodologies, tools, and metrics outlined in this guide, you will be better equipped to analyze, design, and improve processes across various industries. Remember, continuous learning and application of these concepts are vital for achieving operational excellence and sustaining competitive advantage.

Meta Description:

Discover the essential process design glossary with definitions, methodologies, tools, and key terms to optimize workflows and improve business processes effectively.

Process Design Glossary: A Comprehensive Guide to Understanding Key Concepts in Process Engineering

Introduction

Process design glossary is an essential resource for engineers, project managers, and business professionals involved in the development, optimization, and management of processes across various industries. Whether you're working in manufacturing, chemical processing, software

development, or service delivery, understanding the fundamental terminology associated with process design can significantly enhance communication, efficiency, and decision-making. This article aims to demystify the core concepts, definitions, and terms that form the backbone of process design, providing clarity and insight into this complex yet fascinating field.

The Foundations of Process Design

What Is Process Design?

At its core, process design refers to the systematic approach to creating, analyzing, and refining processes that transform inputs into desired outputs. It involves identifying the best methods, resources, and sequences to achieve efficiency, quality, and cost-effectiveness. Process design is not static; it evolves with technological advancements, market demands, and organizational goals.

Why a Glossary Matters

Having a well-defined process design glossary ensures a shared understanding among stakeholders, minimizes miscommunication, and promotes best practices. It serves as a reference point that aligns technical language with operational realities.

Core Terms and Definitions in Process Design

- Process Flowchart

A process flowchart is a visual representation of the sequence of steps involved in a process. It uses standardized symbols to depict operations, decisions, inputs, outputs, and flows.

- Purpose: To visualize workflows for analysis, troubleshooting, and optimization.
- Common Symbols: Ovals (start/end), rectangles (process steps), diamonds (decision points), arrows (flow direction).

- Process Mapping

Process mapping extends beyond flowcharts, encompassing detailed documentation that captures all aspects of a process, including roles, responsibilities, and resources.

- Types: High-level (macro) maps and detailed (micro) maps.

- Benefits: Identifies inefficiencies, redundancies, and bottlenecks.

- Process Optimization

Process optimization involves adjusting processes to improve performance metrics such as throughput, quality, or cost. Techniques include Lean, Six Sigma, and Total Quality Management (TQM).

- Goals: Reduce waste, variability, and cycle time while maintaining or improving quality.

- Process Capacity

Process capacity is the maximum output a process can achieve under specified conditions.

- Factors Influencing Capacity: Equipment capability, labor availability, process design, and input quality.
- Capacity Planning: Ensuring sufficient capacity to meet demand without excessive surplus.

- Process Capability

Process capability measures how well a process meets specified limits or performance standards, often expressed via indices such as Cp and Cpk.

- Cp: Potential capability assuming the process is centered.
- Cpk: Actual process capability considering centering and variability.

Key Process Design Elements

- Process Inputs and Outputs

- Inputs: Raw materials, information, energy, or labor entering the process.
- Outputs: Final products, services, or waste generated after processing.

Understanding these elements helps in designing processes that maximize desirable outputs while minimizing waste.

- Process bottleneck

A bottleneck is a stage in the process that limits overall throughput due to capacity constraints.

- Identification: Through process analysis and flow rate monitoring.
- Mitigation: Increasing capacity, eliminating inefficiencies, or redesigning the process.

- Process Redesign

Process redesign (or reengineering) involves fundamentally rethinking and radically redesigning processes to achieve significant improvements in performance.

- When Needed: When incremental improvements are insufficient or when processes are outdated or inefficient.

Methodologies and Techniques in Process Design

- Value Stream Mapping (VSM)

A lean-management method that visualizes all steps in a process, highlighting value-added and non-value-added activities.

- Purpose: To eliminate waste and streamline workflows.
- Application: Manufacturing, healthcare, software development.

- Failure Mode and Effects Analysis (FMEA)

A systematic approach to identifying potential failure modes within a process, assessing their impact, and prioritizing mitigation strategies.

- Benefit: Enhances reliability and safety.

- Process Simulation

Using software tools to model and analyze process performance under different scenarios.

- Advantages: Predicts outcomes, tests changes before implementation, reduces risk.

Process Design Metrics and KPIs

Key Performance Indicators (KPIs) help measure the effectiveness of a process design.

- Cycle Time: Total time to complete a process.
- Throughput: Number of units processed per time period.
- Yield: Percentage of products meeting quality standards.
- Cost per Unit: Total process cost divided by output.

Monitoring these metrics ensures continuous improvement and alignment with organizational goals.

Industry-Specific Process Design Terms

- Batch Process

A manufacturing process where items are produced in groups or batches, rather than continuously.

- Applications: Pharmaceuticals, food production.
- Advantages: Flexibility, easier quality control.

- Continuous Process

A process that operates non-stop, producing a steady stream of products.

- Applications: Oil refining, chemical manufacturing.
- Advantages: High efficiency, consistent quality.

- Just-In-Time (JIT)

An inventory management approach aiming to reduce waste by receiving goods only as needed in the production process.

- Impact: Minimizes inventory costs, enhances responsiveness.

Challenges and Considerations in Process Design

Process complexity can introduce challenges such as increased costs, difficulty in control, and higher error rates. Therefore, process designers must consider:

- Scalability: Can the process adapt to increased demand?
- Flexibility: Can it accommodate product or service variations?
- Robustness: Is it resistant to variability or disruptions?
- Sustainability: Does it minimize environmental impact?

The Future of Process Design

Emerging trends are shaping the evolution of process design:

- Digital Twin Technology: Creating virtual replicas of physical processes for testing and optimization.
- Automation and Robotics: Increasing efficiency and consistency.
- Data-Driven Decision Making: Leveraging big data analytics to refine processes.
- Sustainable Design: Incorporating eco-friendly practices to reduce carbon footprint.

Conclusion

A solid grasp of the process design glossary is fundamental for anyone involved in developing or refining operational workflows. The terminology outlined in this guide provides a foundation for effective communication, strategic planning, and continuous improvement. As industries evolve and technological advancements accelerate, staying updated with the latest process design concepts remains crucial. Whether you're mapping a new process, optimizing existing workflows, or redesigning entire systems, understanding these core terms will empower you to make informed decisions and drive organizational success.

Final thoughts: Embracing a comprehensive process design glossary not only fosters clarity but also

paves the way for innovation, efficiency, and resilience in an increasingly competitive landscape.

QuestionAnswer What is process design in the context of business management? Process design refers to the planning and development of workflows, procedures, and systems to achieve organizational goals efficiently and effectively. What does 'value-added activity' mean in process design? A value-added activity is a task or step that directly contributes to meeting customer needs or enhancing the product or service, thereby increasing its value. Can you define 'bottleneck' in process design? A bottleneck is a stage in a process that limits overall throughput, causing delays and reducing efficiency in the entire workflow. What is 'lean process design'? Lean process design focuses on eliminating waste, reducing variability, and improving flow to maximize value and minimize resources used. What does 'standard operating procedure (SOP)' mean? An SOP is a documented set of step-by-step instructions that outline how to perform a specific task or process consistently and correctly. What is 'process mapping' in process design? Process mapping is the visual representation of a workflow or process, illustrating steps, decision points, and flow to analyze and improve efficiency. Define 'cycle time' in process design. Cycle time is the total time required to complete one cycle of a process from start to finish. What is 'automation' in process design? Automation involves using technology and machines to perform tasks automatically, reducing manual effort and increasing consistency. What does 'process improvement' mean? Process improvement is the systematic approach to analyzing and enhancing existing processes to increase efficiency, quality, and performance. What is the purpose of a 'process flowchart'? A process flowchart visually depicts the sequence of steps in a process, helping identify inefficiencies and opportunities for improvement.

Related keywords: process mapping, workflow diagram, process optimization, business process, process improvement, standard operating procedures, process analysis, process modeling, process documentation, process engineering

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