



# Industrial Engineering Roles In Industry

**Prepared by the IIE-IAB**

(Institute of Industrial Engineers – Industry Advisory Board)

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# What Do IEs Do?

- Industrial Engineers work to make things better, be they processes, products or systems
- Typical focus areas include:
  - Project Management
  - Manufacturing, Production and Distribution
  - Supply Chain Management
  - Productivity, Methods and Process Engineering
  - Quality Measurement and Improvement
  - Program Management
  - Ergonomics/Human Factors
  - Technology Development and Transfer
  - Strategic Planning
  - Management of Change
  - Financial Engineering



# Project Management

- Develop the detailed work breakdown structure of complex activities and form them into an integrated plan
- Provide time based schedules and resource allocations for complex plans or implementations
- Use project management techniques to perform
- Industrial Engineering analyses and investigations
- Conduct facility planning and facility layout development of new and revised production plants and office buildings
- Form and direct both small and large teams that work towards a defined objective, scope & deliverables
- Perform risk analysis of various project options and outcomes



# Manufacturing, Production and Distribution

- Participate in design reviews to ensure manufacturability of the product
- Determine methods and procedures for production distribution activity
- Create documentation and work instructions for production and distribution
- Manage resources and maintain schedule requirements to meet required production and distribution schedules
- Process Optimization utilizing Simulation tools (Arena, etc.)
- Facilitate and Lead process improvement teams



# Supply Chain Management

- Manage Supplier relationships
- Managing and report on company Supplier Cost / Performance Indices to management
- Audit Suppliers and ensure supplier processes and procedures are being followed
- Travel to suppliers to resolve issues
- Coordinate first article Inspections
- Work with Outsource Manufacturers to ensure product quality, delivery and cost, is maintained





# Productivity, Methods and Process Engineering

- Define proper work methods for tasks
- Define appropriate processes for work flow activities
- Define key production measures
- Define goals and data capture/analysis for key measures
- Perform root cause analysis to improve poor performing processes
- Develop appropriate incentive plans for work tasks
- Determine capacity requirements and subsequent investment options



# Quality Measurement and Improvement

- Resolve quality-related issues in all aspects of the business
- Work with design and production teams and outsource manufacturers to ensure product quality is maintained during the design and production phases
- Audit defined processes and procedures to ensure that they are being followed
- Coordinate and Facilitate 3rd Party Quality Audits
- Provide refresher training on procedures for company personnel on Quality and process-related issues, including the use of analytical tools and techniques such as SPC, Six Sigma, etc.
- Manage and resolve issues with incoming material through the Receiving process



# Program Management

- Develop proposals for new programs
- Manage program/project teams to ensure program stays on schedule, on budget, and meets performance expectations
- Coordinate a matrix of team member across departments within an organization to ensure completion of project tasks





# Ergonomics/Human Factors

- Ensure Human Factors Engineering is utilized in New Product Design
- Ensure Human Factors Engineering disciplines are utilized in production setup and configuration
- Ensure company Ergonomics policies are defined to minimize causes of employee injury and discomfort



# Technology Development and Transfer

- Identify basic business problems requiring analysis
- Determine if technology or process based solution best
- Characterize problem, identify prospective providers/bidders and submit requests for proposals
- Evaluate bid responses, select successful bidder(s) and establish technical feasibility
- Conduct small scale/medium scale tests to determine operational feasibility, implementation methods and training requirements
- Conduct enterprise wide implementation
- Transition support activities/responsibilities to long term business and technology owners



# Strategic Planning

- Develop long range planning models, typically 5-10 years in scope
- Model all areas affected by operation
- Identify anticipated investment in plant, capacity, network, etc.
- Tie to preliminary production cost, operational cost, sales forecasts
- Develop preliminary financial impacts, including profitability and ROI



# Management of Change

- Ensure that change programs are coordinated, support one another and move along the critical path
- Create and maintain the imperative for the change, establish priorities and provide visible sponsorship for the change
- Provide the skills, knowledge, processes, organization structure and tools required to deliver the change
- Ensure that the individuals involved buy into the change, actively support it and adopt their behavior accordingly



# Financial Engineering

- Determine production costs using specific cost based methodology
- Develop budgets, forecasts for operating cost centers
- Measure actual performance vs. budget goals and investigate variance
- Develop capital and expense budgets for capacity expansion
- Perform cost analysis/justification for capital and expense expenditures
- Perform make vs. buy vs. lease analyses





# IEs Work in Many Types of Industries

- Aerospace & Airplanes
- Aluminum & Steel
- Banking
- Ceramics
- Construction
- Consulting
- Electronics Assembly
- Energy
- Entertainment
- Forestry & Logging
- Insurance
- Materials Testing
- Medical Services
- Military
- Mining
- Oil & Gas
- Plastics & Forming
- Retail
- Shipbuilding
- State & Federal Government
- Transportation



# Some Techniques Utilized by IEs

- Benchmarking
- Design of Experiments
- Employee Involvement
- Equipment Utilization
- Flow Diagramming
- Information & Data Flow
- Diagramming
- Interviewing for Information
- Lean Manufacturing
- Modeling & Testing
- Operations Auditing
- Organizational Analysis
- Pilot Programs
- Plant & Equipment Layout
- Project Management
- Simulation
- Six Sigma projects
- Statistical Analysis
- Strategic Planning
- Theory of Constraints
- Time Studies
- Work Sampling

