Speed to Market

Innovative and Rigorous
New Product Development

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April 7, 2020

About Myself …

- Education
  - BS ChE, Cornell & MBA, Babson
- 20 years complex global new product development
  - Roles
    - Process Development, Engineering, Quality, PMP
  - Industries
    - Life Science
      - Medical Device & Biotech – GLP, GCP, cGMP, ISO 13485
    - Specialty Chemicals, PPE – ISO 9001
  - Project Management
    - PMP – Phase gate
    - Agile/Scrum - R&D IT PMO

Introduction

- Case Study: Honeywell Safety Products
  - Oct 2010 – May 2013
- Turboshield™ – Faceshield platform (PPE)
  - Launch Video (1:42)
  - Global team (US, EU), global vendor base (US, EU, Asia)
  - Small private to large corporatie
- Challenges: Concept to Launch
  - Requirements to test strategy
  - Design to risk management

Vision

- Voice of Customer
  - NA – Construction, shipyard, chemical plant
  - EU – Scotland, Germany
  - Innovative, ergonomic, integrated
- Scope
  - Global – US, CAN, EU, AUS/NZ
  - EU – Backward compatible (Supervizor visors)
  - Compatible with other PPE (hardhats, hearing, respiratory)

Overview

- Stage Gate Process
  - NPI 5-phase process
  - Progressive risk reduction
    - Idea Proposal, VOC, Concept, Requirements, Development, Testing & Validation, Delivery & Support
    - CapEx approval @ end of phase 3, exit dates locked down
- Key Project Dates
  - RFQ (year 0.5), Test Plan (year 1.5), Eng Report (year 2.5)
  - Phase 3 (year 1.5), Phase 4 (year 2.3), Launch (year 2.5)

Project Management

Planning

- Scope – VOC, requirements, test plans, certification plans
- Roles and Responsibilities – Marketing, R&D, Quality, PM
- Stakeholders – Functional leads, Sourcing, Supply Chain, Legal, Finance
- Project plan – Scope, resources, time
- Weekly team meetings
- Communication

Implementation & Control

- Engagement (vendors, certification labs/bodies)
- Risk Mitigation
  - DFMEA
    - R&D (Eng) + Quality
    - Test early, test often, test to fail
  - Vendor selection
    - Visor – Decision matrix, audits
    - HG & HHA – Best qualified
  - NPI test strategy
    - Same for all 3 subsystems

Risk Management (1 of 2)

- Visor Design Control
  - Toric – vertical & horizontal, inside & outside diameters
  - Optical Science – Monte Carlo simulation
  - Collaboration – scientist & design engineer
  - Experience & expertise (+ good luck) with IR dyes for welding shades
- Visor Quality Assurance
  - Vendor selection – decision matrix
  - Global Supplier Quality – technical & quality audits
  - US based vendor, excellent quality, good service

Risk Management (2 of 2)

Headgear

- Failed initial HMI test
  - High speed videography
  - Engineering redesign
  - Finite Element Analysis
    - Material properties, geometries
    - Simulations
    - Compared 2 materials
    - Confirmation vs. actual measurements
    - Case Study by CAE Associates

Hard Hat Adaptor

- Last sub-system to complete
- Two last minute issues
  - Force vs. ease of movement
  - Noise reduction

  using 2 benchmark hard hats
- Recovery
  - Alternate materials – US & China dual paths
  - Contingency inventory
  - Delay < 2 mon (3/13 – 5/13)

Critical Path Management

Vendor Management

- Visor Tooling & Quality
  - Visor – Mold cast in China, polished in US.
    - Sourcing, air shipment
    - Vendor quality (6 rev/6 mon)
- HG & HHA Tooling & Quality
  - Staggered, leveraged 24 x 7
  - Relationship
  - Leveraged HON China – at factory, bilingual quality system development

Certification Management

- EN Certification
  - ANSI/CSA own lab
  - Comprehensive SOW
  - German lab: 2 conference calls cemented test matrices
  - Turboshield visors, HG, HHA + Supervizor visors + compatible hard hats

Process Validation

- Same test strategy for all 3 sub-systems without net increase to project cycle time
  - First article
  - Certification testing
  - Launch build
- Engineering verification (above +)
  - Visor – Clear visor fluorescence (2 PC resins qualified)
  - HG & HHA – Environmental, use/abuse, cycle (life) testing
- Documentation
- “Right the first time” more critical than CT for NPI

Quality Architecture

- System Level Quality Control
  - AUS certification stipulated system quality plan
  - AQL based system level testing
- Visor Quality Plan (optics, impact)
  - Tooling & materials specs
  - Production release COA per ANSI/CSA – 6 rev/6 mon
- Headgear & HHA Quality Plans (impact)
  - Tooling & materials specs
  - HON templates, impact testing, CTQ based inspection

Successful Launch

- Innovative global product
  - Platform – 3 sub-systems, backward compatible with EMEA Supervizor visors, plug & play with other PPEs
  - Innovative – Toric visor, 3 US patents (HG suspension, HG to visor attachment, HHA clutch mechanism)
  - Launch – NA & EU 5/13, AUS/NZ 12/13, ISHN awarded 2014
- Project performance metrics
  - High “first pass yield” using rigorous
    - DFMEA, engineering verification, certification validation
  - Good “cycle time” based on
    - Planning, critical path, risk management
- Continued robust sales ($$)

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