Successful Mechanical Product Development in Today’s World
by
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Fusion Design

- Custom Product and Equipment Design
- Established: 1990
- Projects: 50-100 year
- Staff: 20
- Facilities:
  - 6,000 square foot office
  - Machine Shop
  - Design Studio
  - Modeling Shop/Lab
Fusion Design

- President: Mark Brinkerhoff P.E.

- Clients: Entrepreneurial start-ups to Fortune 100 companies.

- Projects: Small plastic enclosures to large commercial equipment

- Industries Served:
  - Consumer
  - Medical/Biotech
  - Electronics
  - Commercial
  - Equipment
Waterfall Diagram for Design Control (from FDA "Design Control Guidance for Medical Device Manufacturers"
Business before the Pandemic

- Relationship connectivity to prospects
- Phone introduction
- NDA
- Onsite visit / needs assessment
- Gather data and sample parts in person
- Consider development path / tasks
- Ask clarifying questions
- Propose approach / budget
- Purchase order placed
- Team assignments (PM, Engineer / Designers / Technicians)
- Weekly strategic meetings plus ad hoc meetings
- Scheduling / budget management
- Design / Prototype
- Milestone meetings in person
- Deliverables in person
Fusion Design Shifting Gears

COVID-19 Prepared

[Diagram of a checkmark symbolizing preparedness for COVID-19]
Business after the Pandemic

- Relationship connectivity to prospects
- Phone / Video Conference introduction
- NDA
- Needs assessment
- Gather data and sample parts
- Consider development path / tasks
- Ask clarifying questions
- Propose approach / budget
- Purchase order placed
- Team assignments (PM, Engineer / Designers / Technicians)
- Weekly strategic meetings plus ad hoc meetings
- Scheduling / budget management
- Design / Prototype
- Milestone meetings
- Deliverables
Customer Shifts (Old, New, Gone)

- Long term continued
  - Closed buildings
  - Working from home
  - Heavy confusion/poor communication
- Divisions / companies disappeared
  - Physical presence gone
  - Food service gone
  - Distributed system with poor connectivity
- Companies at War with Covid
  - Extremely high volume testing (centralized)
  - Regional testing for fast turn around
  - PPE
  - Automation
  - Semiconductor Processing Equipment
Where is everybody?

Office Team
- Shop Team
- Management
- HR
- Accounting

Remote Team
- Engineers
- Designers
- Customers
- Vendors
Communication Tools

In the office

- Common Wifi network
- Video Hardware
  - BEAM
  - Smart Phones
  - Tablets
  - PCs
  - Webcams / Video Scopes
- Software
  - SolidWorks Edrawings
  - TEAMs
  - Zoom
  - Blue Jeans
  - Whatsapp
  - Google

Everywhere else

- Wifi / 4G
- Video Hardware
  - Smart Phones
  - Tablets
  - PCs
  - Webcams
- Software
  - SolidWorks Edrawings
  - TEAMs
  - Zoom
  - Blue Jeans
  - Whatsapp
  - Google
Communication Tools

- In the office
- Everywhere else
Fabrication Tools

- In the office
  - Machine
  - Sheetmetal forming
  - Hand
  - 3D printers
  - Large Plotters

- Everywhere else
  - Hand tools
Rapid Sourcing

- Through Rapid Mail
  - Components
  - Mock ups
  - Prototypes
  - Short Run Production
- Through the Store next door
  - Mock up components
  - Hardware
  - Hand tools
Communication Rhythms

- 10 to 15 active projects continuously
- Weekly Strategic Meetings
- Ad hoc working Meetings
- Video Calls daily
- BEAM Visits
- Walking meetings (treadmill and outdoors)
- Rapid Status
- Whatsapp concepting
- Cloud based data sharing
Typical Project Deliverables

- Edrawings
- Videos
- CAD models
- CAD Drawings
- 3D prints
- Machined Parts
- Sheetmetal
- Assemblies
- Posters
- Proof of Concepts
- Working prototypes
- Short run production
Top 5 Development Process Challenges

1. Lack of True Market Research

2. Incomplete project plan
   Recognize the big picture

3. Incomplete / inconsistent communication
   Management, engineering disciplines, fabricators, Ops, Regulation, others.

4. Creeping Elegance (Feature Creep)
   More features = better products??

5. Remote Manufacturing
   Global
What Trends are Next?

**Megatrends**

- Component Prices Dropping
- Automation is easier than ever
- Labor Rates Increasing
- Medical Costs Rising
- Aging Population
- Crowding fears

**Effects**

- Tighter Integration with hardware, software and the cloud
- Collaborative Automation Systems
  - Food preparation, autonomous driving
  - General Labor reduction
- Products will address multiple industries
  - Medical and fitness / wellness
- Products will grow from more disciplines
  - Art, Ergonomics, Science and Manufacturing
- Winners will thrive in the transition space
What’s Biz Tech is next?

- VR / AR (maybe)
- Telepresence
  - Robots
  - Automatic doors
  - Dumb waiters
- TEAMs 2
- Online interactive sketching
- 5G connecting everything seamlessly
- Gamification
- Visual Search AI
- Move while working (quiet treadmills)
- HUGE productivity boost
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