

# Medical Device Design



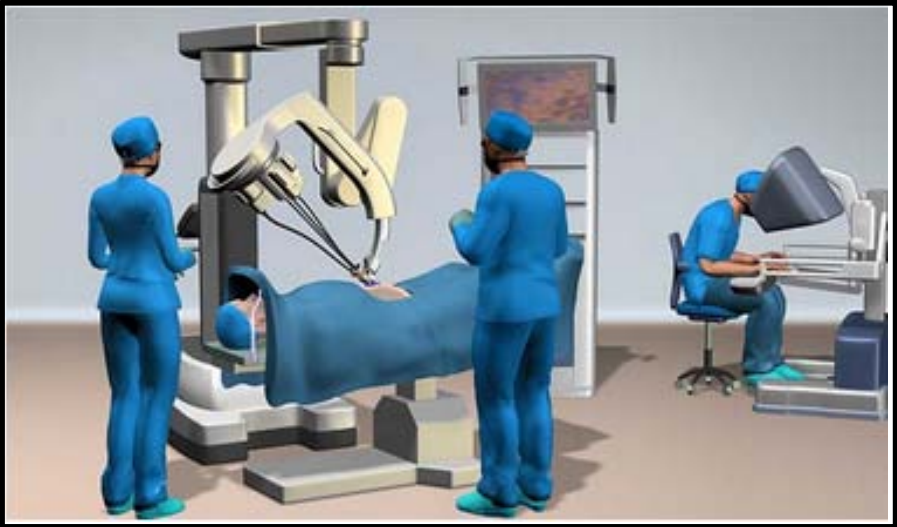
Chris Schall  
Ethicon R&D  
Aug 17, 2022

# Topics

- **Surgical Approach & Surgical Specialties**
- **Ethicon Product Categories**
- **Ethicon Product Development Process**
- **Medical Device Material Considerations**
- **Case Study**



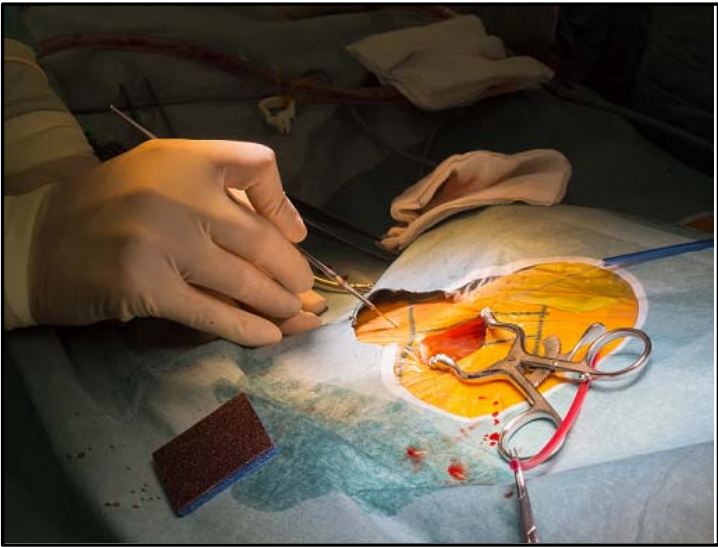
# Surgical Approach



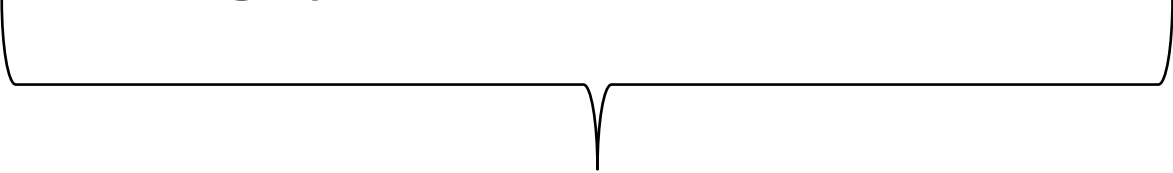
**Robotic  
Surgery**



**Laparoscopic  
Surgery**



**Open  
Surgery**



**Handheld Devices**

# Common Surgical Specialties



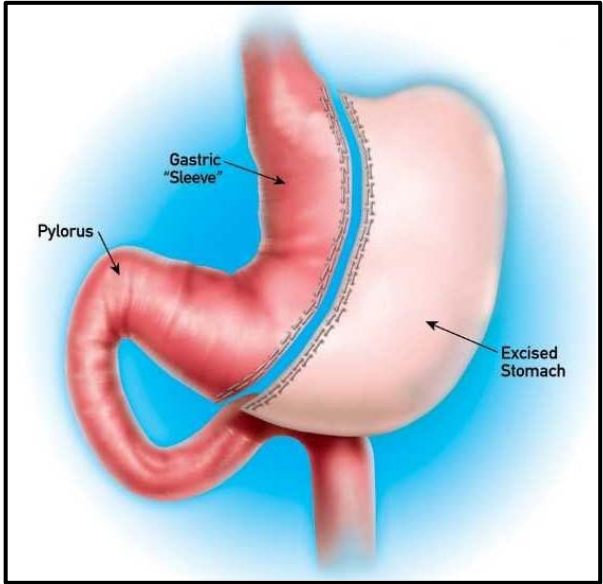
**Thoracic  
Surgery**



**Colorectal  
Surgery**



**General  
Surgery**



**Bariatric  
Surgery**

# Ethicon Surgical Device Product Categories

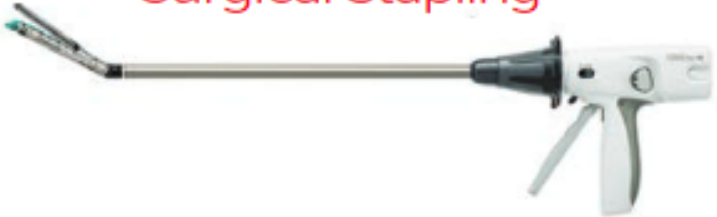
Access



Energy



Surgical Stapling



Wound Closure



Ligation



Magnetic Sphincter Augmentation

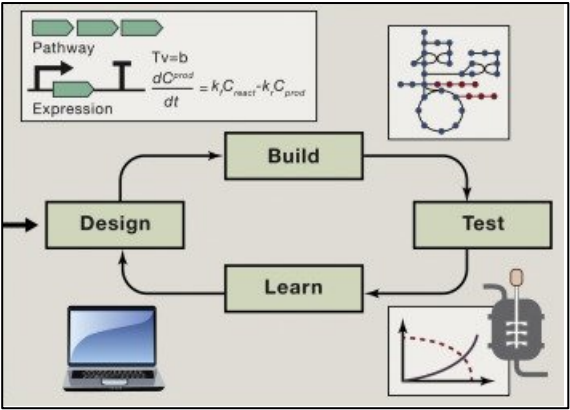
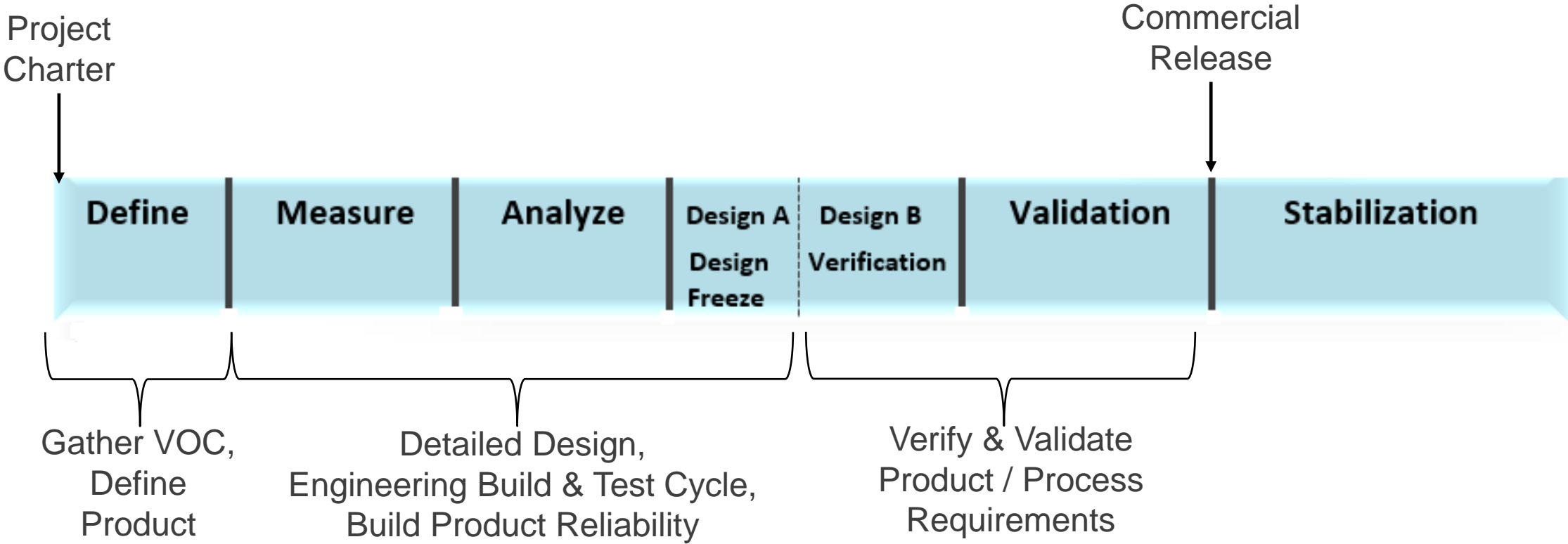


Hernia Repair & Fixation





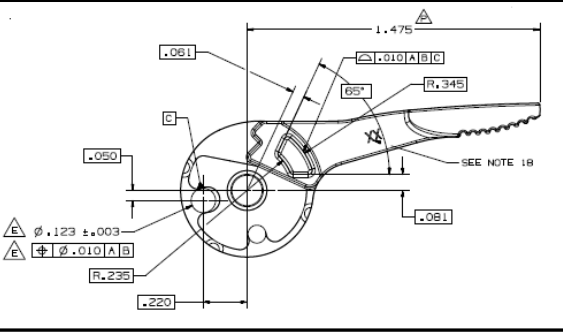
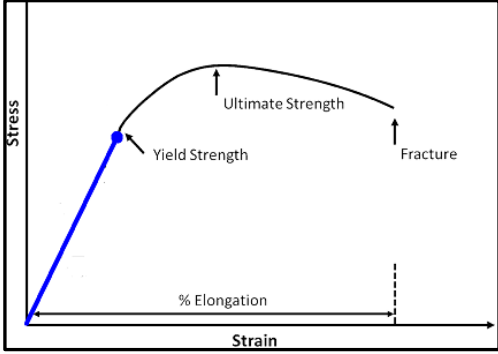
# Ethicon Product Development Process



# Medical Device Material Considerations

## Single Patient Use Devices

- Mechanical Properties
- Manufacturing Properties
- Dimensional Accuracy
- Biocompatibility
- Sterilization (Gamma / EO)
- Material Stability (5 Year Shelf Life)
- Cost
- Supply Chain Stability & Continuity
- Environmental / Disposal

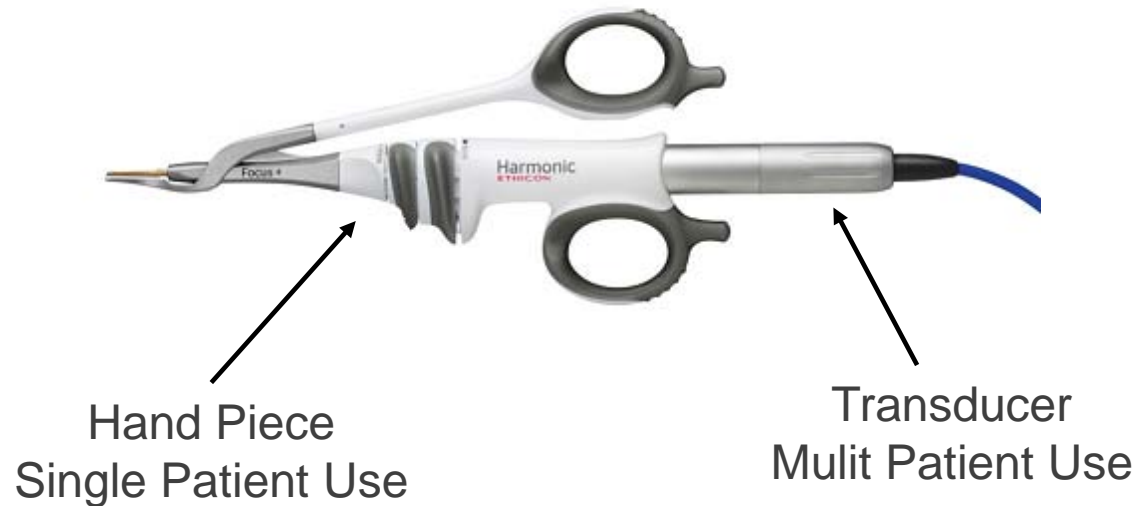


***A Very Demanding List of Material Requirements!!!***

# Medical Device Material Considerations

## Multi Patient Use Devices

- Similar material requirements as Single Patient Use
- Can absorb slightly higher material costs due to reuse
- Reusable components often metal, Autoclave sterilization within hospital





# Case Study – Plastic Endocutter PCR

**Project Goal:** Create lower cost plastic Prox Channel Retainer to replace 7075 Alum design



## Plastic PCR Material Considerations

- Device Performance & Reliability must be maintained!!!
- Withstand over 200lbs of tensile force
- Elastic Modulus & Yield Stress similar to Aluminum
- Injection moldability & dimensional accuracy

## Plastic PCR Results

- Change transparent to the Surgeon
- Material Selected: 40% Carbon Filled Nylon
- ~\$10/device COGS reductions

