Financial and Technical Review of Endoscope Service

-From a BME perspective

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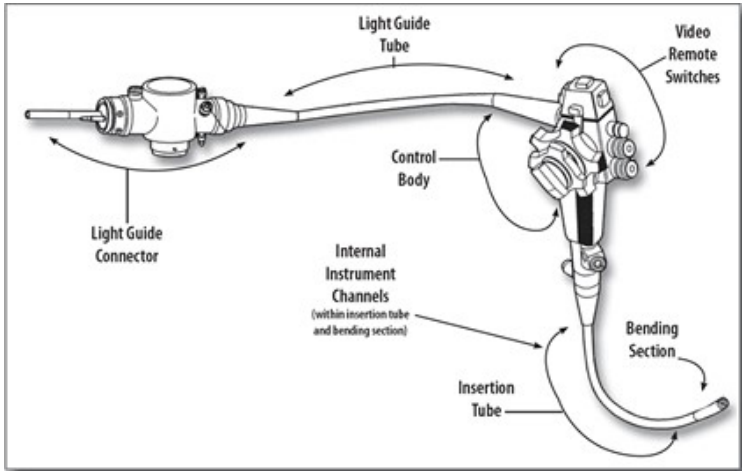
Endoscope Principle and Overview

- Light Guide Connector
- Light Guide Tube
- Control Body
- Insertion Tube
- Bending Section



Common Fault and Causes

Common minor and major endoscope repairs list in general order of frequency [2]

Minor	Major
Bending section cover repair	Fluid invasion repair
Angulation adjustment	Video control/switch repair
Distal tip cover replacement	Biopsy/suction channel repair
Angulation control knob repair	Insertion tube repair
Nozzle replacement	Air/water assemblies repair
Electrical connector replacement/Repair	CCD imaging unit replacement
Light guide connector repair	Overhaul
Air/water O-ring Replacement	Elevator repairs
Air/water cylinder replacement	Light guide lens unit repair/replacement
Air/water valve replacement	Universal cord replacement

Causes:

- 70% of these fault comes from mishandling which can be prevented [2]
- Wear and Tear

Service Resources

OEM

Advantages:

- Warranty and service contract coverage
- Loan Unit supply in time
- Standard parts and service

Disadvantages:

- Service could be very expensive when out of warranty/service contract cover period

3RD PARTY SERVICE COMPANY

Advantages

- Cost effective
- Quick turnaround time
- Free fault evaluation option

Disadvantages:

- Limited Loan unit supply
- Parts/accessories Compatibility
- Technique vary

Case Study:
Service Base on 11 Scopes of RPAH 2015-2016
(Out of OEM Warranty/Contract Cover)

- Scope Type: Cystoscope x 6 Gastroscope x 2 Bronchoscope x1 Colonoscope x2
- Repair Summary

Average failure times: 3 times/unit/year.

Failure interval: Vary form 1 month to 8 months, average 4 months

Repair Type: 1 Major Repair, 2-3 Minor Repairs

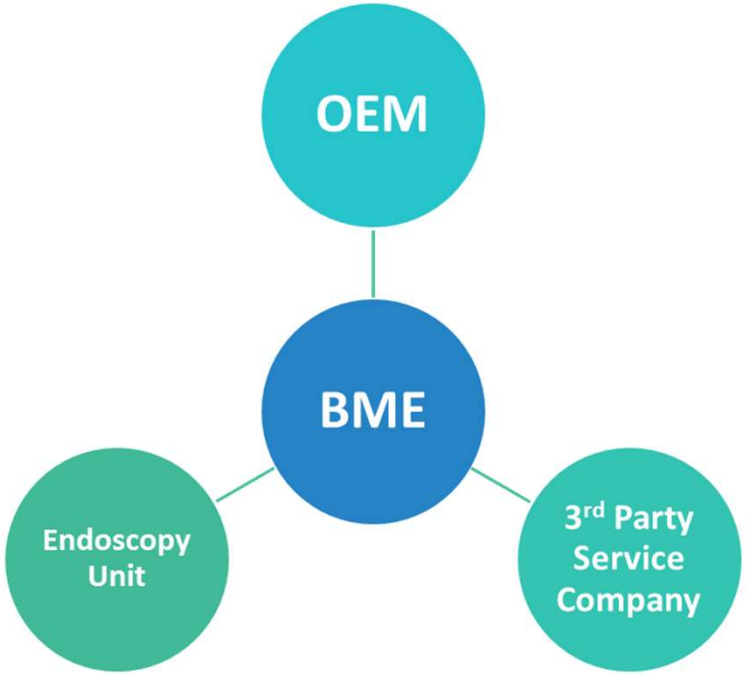
Repair Cost: Average approximate $3500/unit/year

Service Turnaround time: Major repair 1 month Minor repair: 2 days-1 week

Common Fault: Minor: Bending rubber hole, adjustment of Angulation, faulty button

Major: Insertion tube/Light tube wear and tear need rebuilt, Biopsy channel damage

BME Engagement in Endoscope Service



- Contract management
- Service quote review
- Service performance validation
- Communication point

- ❑ Minimize faulty times, prevent repeating fault
- ❑ Minimize service turnaround time
- ❑ Minimize service cost
- ❑ Ensure enough clinical use (Loan unit)

Preventive Inspection

- Examine the outer surfaces of the flexible tubes for dents, buckles, or other abnormalities.
- Inspect distal tip, including glass lenses, for any impact damage.
- Check that the angulation system is functioning in all directions.
- Check the bending section for any sharp or rough edges that could cause patient injury.

Summary and Further Improvement

- **Training and Education:** Prevent scope failure through education and training includes: Procedural Use, Transportation, Leak testing, Cleaning and Storage.

  Educational Tool Example: https://www.health.qld.gov.au/endoscopereprocessing

- **Collaborations and Communications:** Tracing root cause and failure trend (e.g. fluid invasion, glue chip) and feedback between Endoscopy Unit and Service Company

- **Service standard:** Proper documents and evidence based service performance make sure all service provider meet OEM standard.

Reference

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[4] Anonymous Spotting endoscope repair warning signs. *Healthcare Purchasing News 36(11),* pp. 48. 2012.

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Thank You

Questions