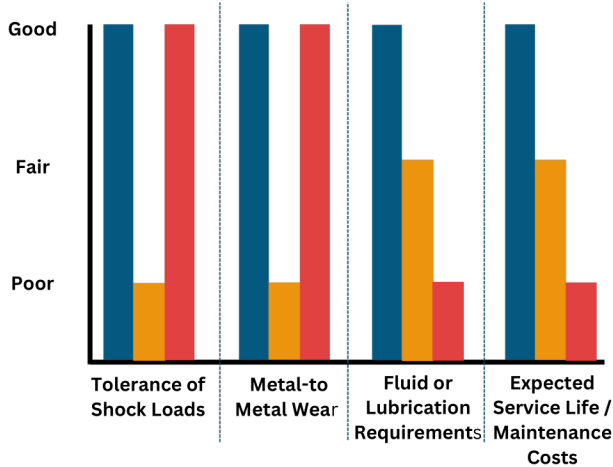


Infographic: Comparing Types of Actuator Technologies

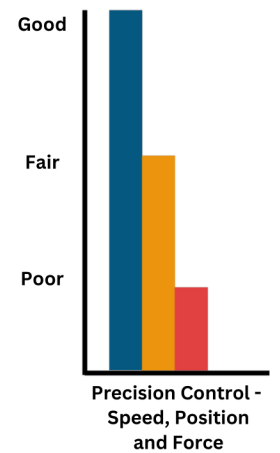
■ Servo Electro-Hydraulic (SHA) vs.
 ■ Electro-Mechanical (EMA)
 vs. ■ Hydraulic (HPU with Cylinder)

Reliability / Maintenance



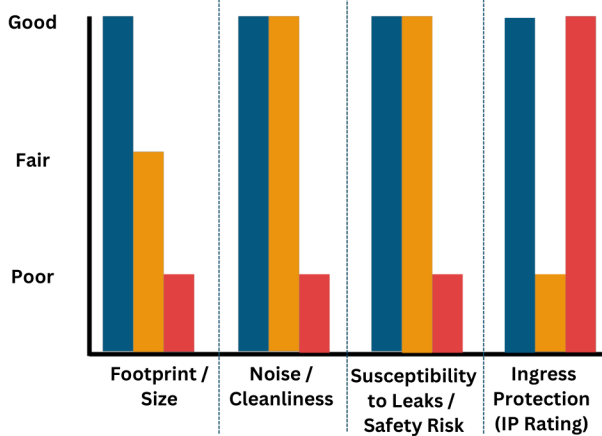
- EMAs are damaged by shock loads and wear from metal-to-metal contact. Must be oversized to extend life.
- EMAs require frequent lubrication to extend service life.
- SHA requires no PM other than a rod seal change (after years of use).
- Hydraulics require regular replacement of oil, filters, hoses and other components.

Precision Control



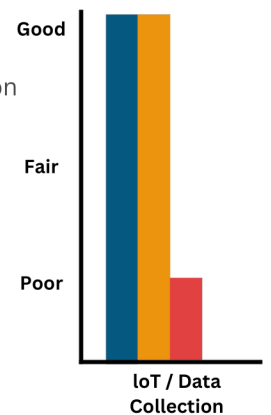
- EMAs require expensive load cells for force measurement.

Space / Ergonomics / Environment



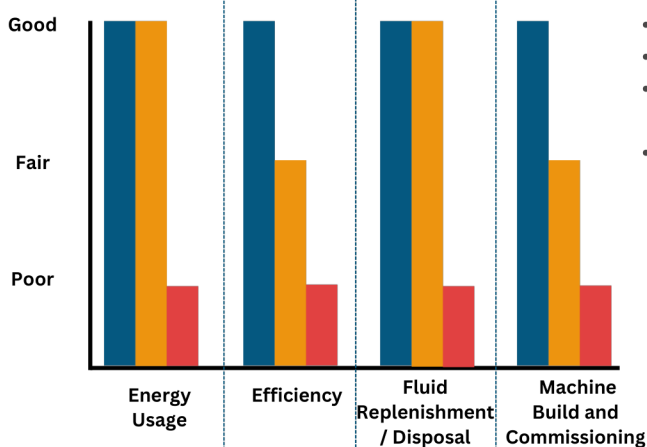
- SHA has Force density of a hydraulic cylinder without the HPU. SHA contains minimal fluid.
- EMA Force-density is lower than a Hydraulic Cylinder.
- Hydraulics frequently leak, are dirty and create noisy and unsafe conditions.

Data Collection



- Hydraulics require expensive instrumentation for IoT.

Economics / Cost of Ownership



- Power-on-Demand saves energy.
- Metal-to-Metal Friction reduces efficiency.
- Hydraulics run continuously, are very inefficient, and require regular fluid changes.
- SHA is all-in-one while Hydraulics have many components.

