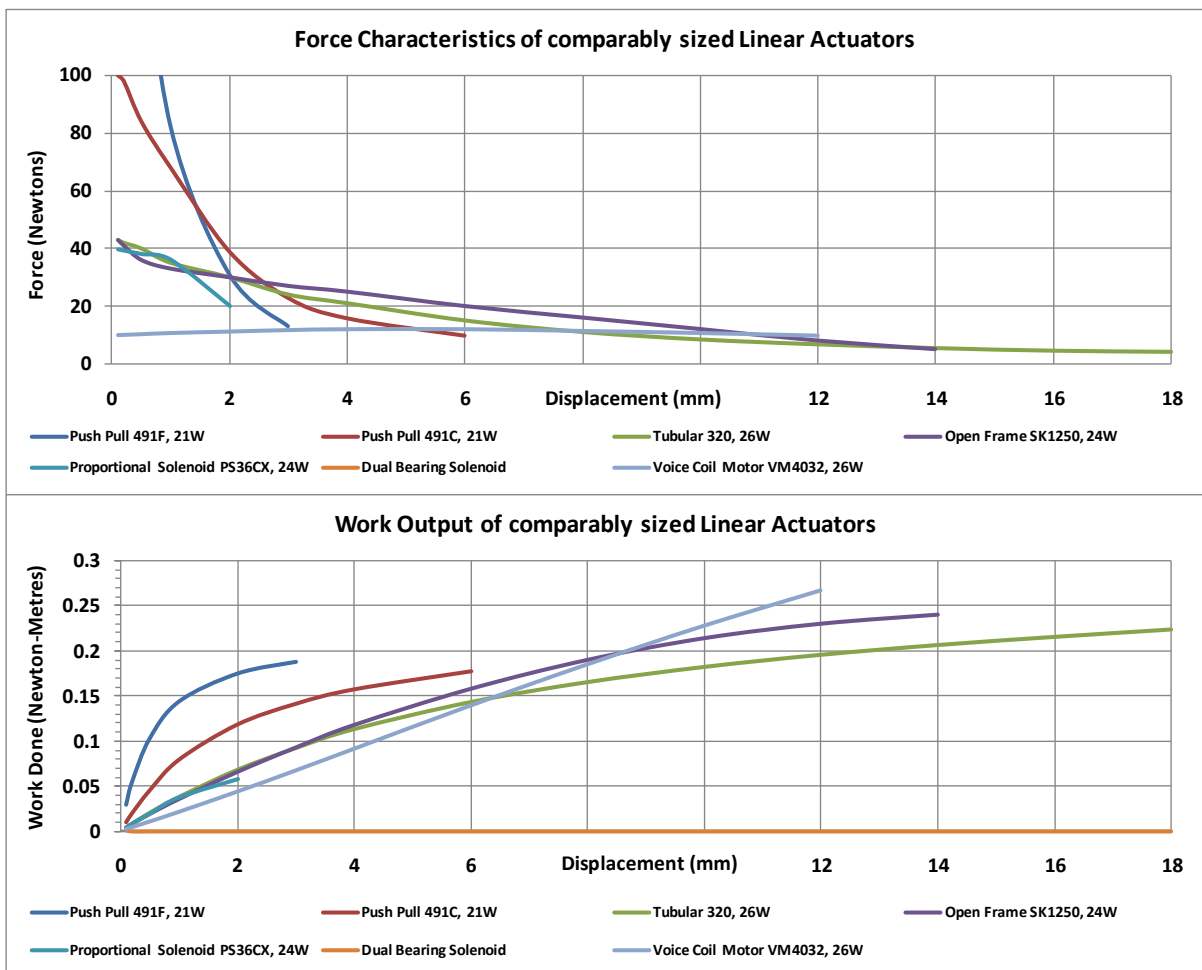




There are many different factors that can influence the choice of a linear actuator, some of these are described, the selection process aims to identify the least expensive device which can satisfy requirements of the application.

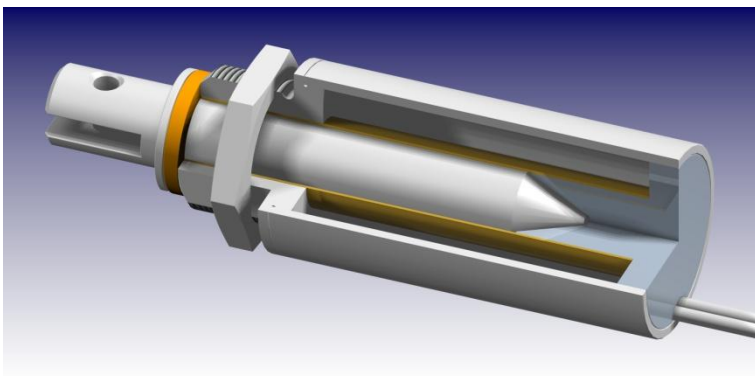
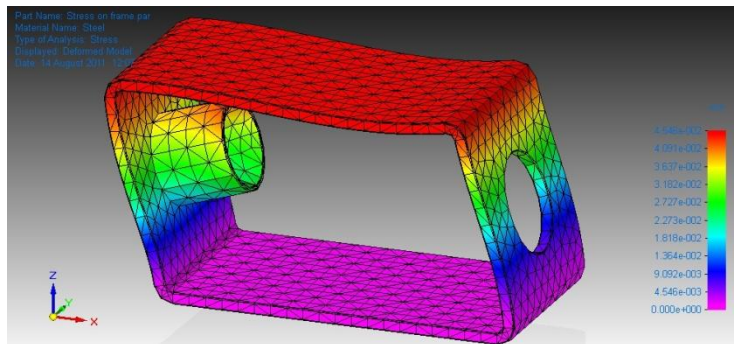
Force Characteristic & Mechanical Work

The graphs below show the force vs displacement, and work vs displacement characteristics for actuators of different types with similar weight and power input. It is clear that for short displacement the push-pull solenoids produce much higher force than other types. The flat force characteristic of proportional solenoid and voice-coil motor lends itself to control of position, rather than simple 'on-off' function. Work carried out by the voice coil is higher because it can drive in both directions, other solenoids require a spring to return in the other direction.



Life Expectancy

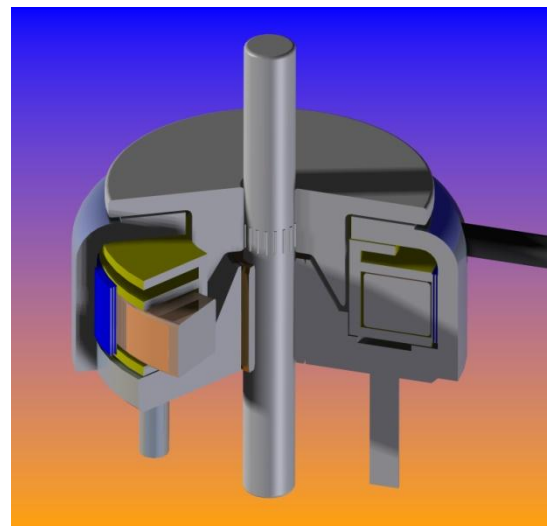
The life expectancy of a solenoid is affected by wear of sliding surfaces, and by fatigue and impact failure of component parts. For open-frame devices, life expectancy may be limited by fatigue of the steel frame which has limited rigidity, the image shows in exaggerated form how the frame distorts when the plunger impacts the end stop of the solenoid, under repeated cycles the frame may fatigue and break, typically at the staked joints, or bends in the frame. This mode of failure is more likely to occur with large parts operating at high force and with heavy loads.



Both the open frame solenoid, and the tubular solenoid, employ a construction in which the plunger slides directly in the sleeve of the solenoid, which may be a brass or stainless steel sleeve, or in some cases the plunger slides directly in the

plastic coil former. Plunger and/or sleeve may be treated to reduce friction, treatments include molybdenum disulphide, nickel plating, Teflon coating and other. These treatments can prolong life considerably to many millions of cycles.

The push-pull solenoid and voice coil motor utilise a separate shaft as bearing surface, and bushes of bearing material. These are made from materials well suited to withstand wear, and to manufacture with a fine finish for optimum wear life.



Speed of Operation

The response speed of an actuator