**DESIGN AND ANALYSIS OF PIVOTING TOOL HOLDERS**

**ABSTRACT**

A collet [/ˈkɒlɨt/](https://en.wikipedia.org/wiki/Help%3AIPA_for_English) is a holding device—specifically, a subtype of [chuck](https://en.wikipedia.org/wiki/Chuck_%28engineering%29)—that forms a [collar](https://en.wiktionary.org/wiki/collar) around the object to be held and exerts a strong clamping force on the object when it is tightened, usually by means of a [tapered](https://en.wikipedia.org/wiki/Machine_taper) outer collar. It may be used to hold a work piece or a tool. An external collet is a sleeve with a (normally) [cylindrical](https://en.wikipedia.org/wiki/Cylinder_%28geometry%29) inner surface and a [conical](https://en.wikipedia.org/wiki/Cone_%28geometry%29) outer surface. The collet can be squeezed against a matching taper such that its inner surface contracts to a slightly smaller diameter, squeezing the tool or work piece whose secure holding is desired. Most often this is achieved with a spring collet, made of [spring steel](https://en.wikipedia.org/wiki/Spring_steel), with one or more [kerfs](https://en.wiktionary.org/wiki/kerf) cuts along its length to allow it to expand and contract. An alternative collet design is one that has several tapered steel blocks (essentially tapered [gauge blocks](https://en.wikipedia.org/wiki/Gauge_block)) held in circular position (like the points of a [star](https://en.wikipedia.org/wiki/Star_%28polygon%29), or indeed the jaws of a jawed chuck) by a flexible binding medium (typically [synthetic](https://en.wikipedia.org/wiki/Synthetic_rubber) or natural rubber). The Jacobs Rubber-Flex brand is a name that most machinists would recognize for this type of collet chuck system. Regardless of the collet design, the operating principle is the same: squeeze the collet against the tool or work piece to be held, resulting in high [static friction](https://en.wikipedia.org/wiki/Static_friction). Under correct conditions, it holds quite securely.An internal collet is used to lock two telescoping tubes together. In this case the collet is in the form of a truncated cone drilled and threaded down the centerline. the collet diameter matches the bore of the inner tube, having the larger end slightly greater than the bore while the smaller diameter is slightly less than the bore. A threaded stud, anchored at its other end to the tube, is then used to pull the collet into the tube. The increasing diameter of the collet forces the inner tube to expand and be pushed against the inner wall of the outer tube thus locking the two tubes together. The inner tube is often slotted to facilitate this expansion.

In this project, we will design one tool holder with standard dimensions in solid works premium 2014 software. Later on, we perform structural and torque analysis on the model with different loads and materials.