Boothroyd-Dewhurst Design for Manufacturing and Assembly

Demonstrated in Figure 1 is the Piston Assembly that was used to assess the design for assembly. Each component was assessed by its ease of assembly and difficulty of handling. These attributes determine different numbers of each component that contribute to the amount of necessity each component has to the assembly.

Figure 1 Piston Assembly Example

Figure 2 shows the calculation of each component of assembly starting with the main block since it is customary to assemble from the bottom up. The importance of this assessment is to determine the cost of assembly and how much time it will take to do so. With less parts to assemble or an easier design of assembly, it can be more cost efficient than the opposite. Just like it is more cost efficient when a part has to go through less machining operations. The less time it takes to work on the part, the cheaper it can be.
As shown in Figure 2, the number in column 7 shows the estimated total operation time for each component of the assembly. The two components that take the longest amount of time to assemble are the cover and the screws because they follow the assembly of the spring component which makes it difficult to contain the whole assembly. Figure 3 demonstrates the redesign of the assembly in Figure 1. This was done by taking the two components that took the longest to assemble, the screws and cover plate, and combining them together to create a snap on cover. This allows for quick and efficient assembly.

From this design for manufacturing assignment, I was about to learn about the important of simplistic design. More is not necessarily better. The more time it takes to assemble something that has a fair amount of complexity, the higher the cost and needs to be considered for redesign.
Figure 3 Redesigned Assembly