Table 1. Advantages and Disadvantages of Auger, Rotary, and Cable Tool Drilling

Type	Advantages	Disadvantages
Auger	• Minimal damage to aquifer • No drilling fluids required • Auger flights act as temperary casing, stabilizing hole for well construction • Good technique for unconsolidated deposits • Continuous core can be collected by wire-line method	• Cannot be used in consolidated deposits • Limited to wells less than 150 ft in depth • May have to abandon holes if boulders are encountered
Rotary	• Quick and efficient method • Excellent for large and small diameter holes • No depth limitations • Can be used in consolidated and unconsolidated deposits • Continuous core can be collected by wire-line method	• Requires drilling fluids, which alter water chemistry • Results in a mud cake on the borehole wall, requiring additional well development, and potentially causing changes in chemistry • Loss of circulation can develop in fractured and high-permeability material • May have to abandon holes if boulders are encountered
Cable Tool	• No limitation on well depth • Limited amount of drilling fluid required • Can be used in both consolidated and unconsolidated deposits • Can be used in areas where lost circulation is a problem • Good lithologic control • Effective technique in boulder environments	• Limited rigs and experienced personnel available • Slow and inefficient • Dificult to collect core

Source: EPA (1989).

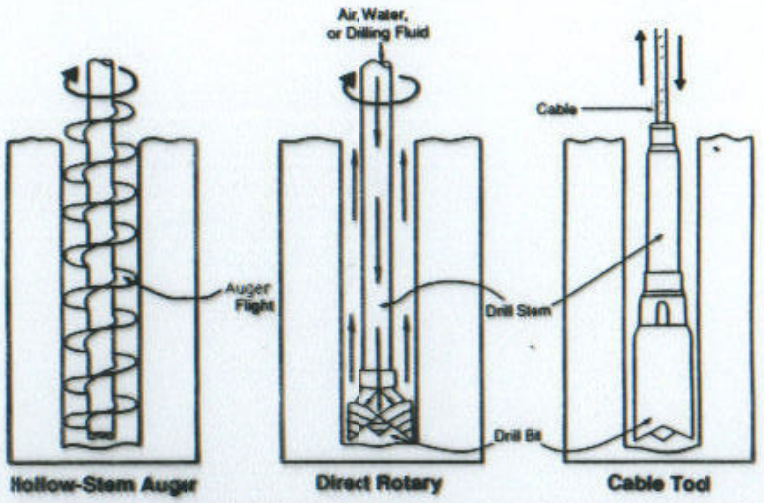


Figure 2. Illustraton and advantages and disadvantages of auger, rotary, and cable tool drilling. *Source:* EPA (1989).

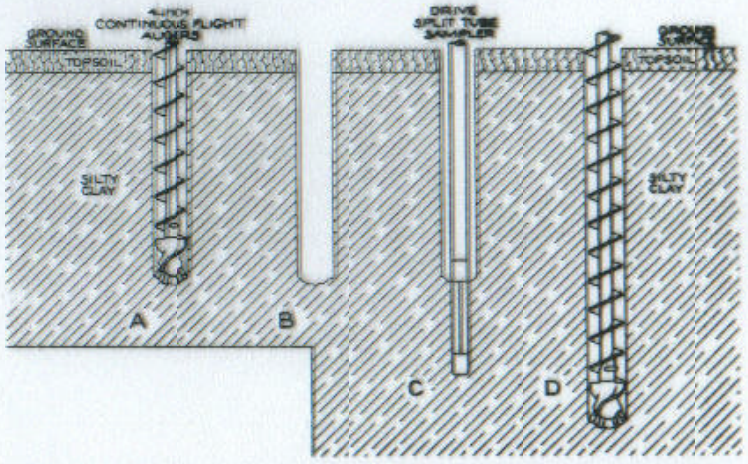


Figure 3. Continuous flight auger drilling. A. Advance auger to sampling interval; B. Remove flight augers; C. Advance split-spoon sampler; D. Advance auger to next sample interval. *Source:* University of Missouri, Rolla (1981).

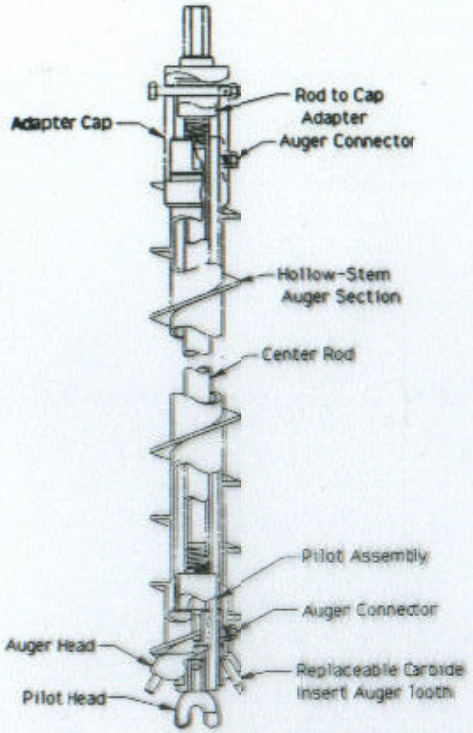


Figure 5. Components of a consolidated mining equipment hollow-stem auger. *Source:* University of Missouri, Rolla (1981).

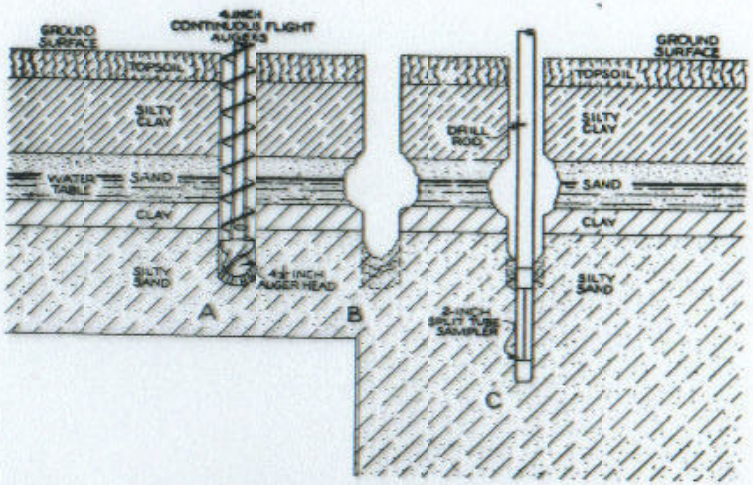


Figure 4. Continuous flight auger drilling through caving material. A. Auger to sample interval; B. Saturated sand stratum flows causing borehole to "bell"; C. Sampler must advance through sand "flow" slough to sample in-placesilty sand. *Source:* University of Missouri, Rolla (1981).

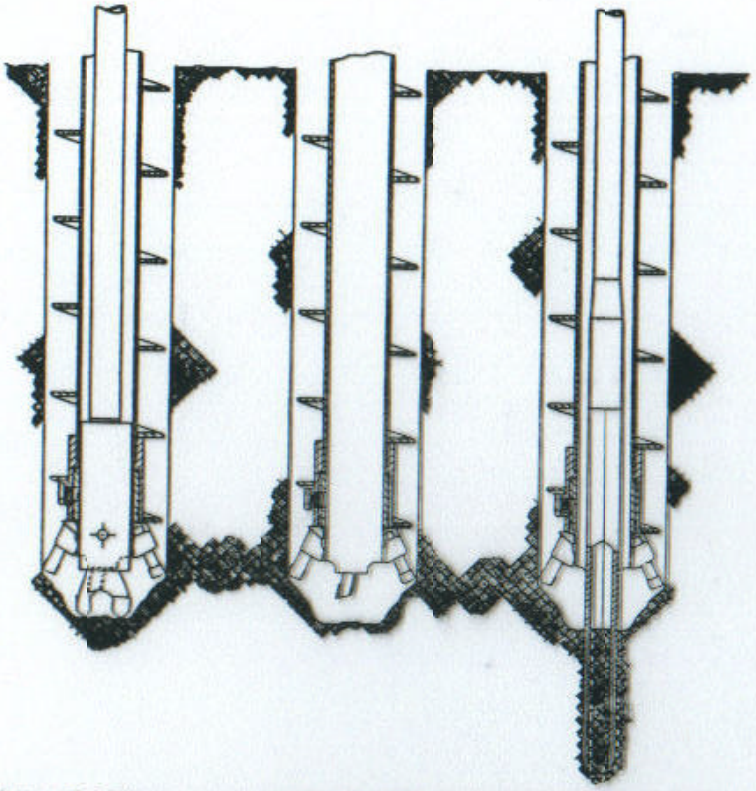


Figure 6. Driving a soil sampler through the hollow-stem auger. *Source:* University of Missouri, Rolla (1981).

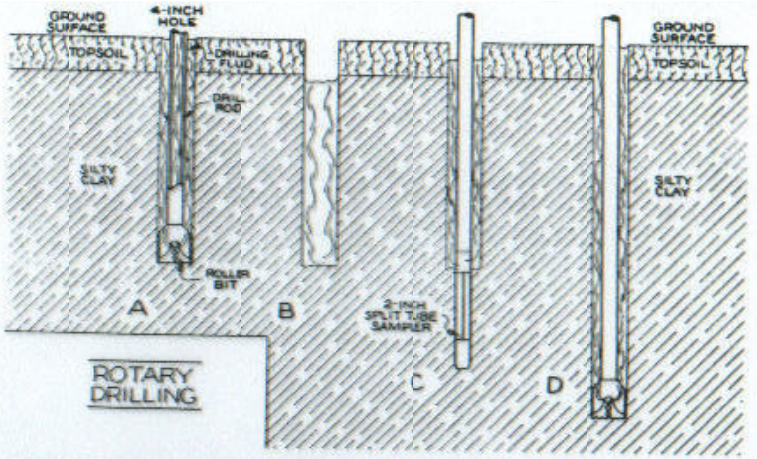


Figure 7. Rotary drilling. A. Mud rotary drilling advance to sampler interval; B. Drilling mud holds borehole walls up; C. Split-spoon sampler advanced; D. New drill rod attached and borehole advanced. *Source:* University of Missouri, Rolla (1981).

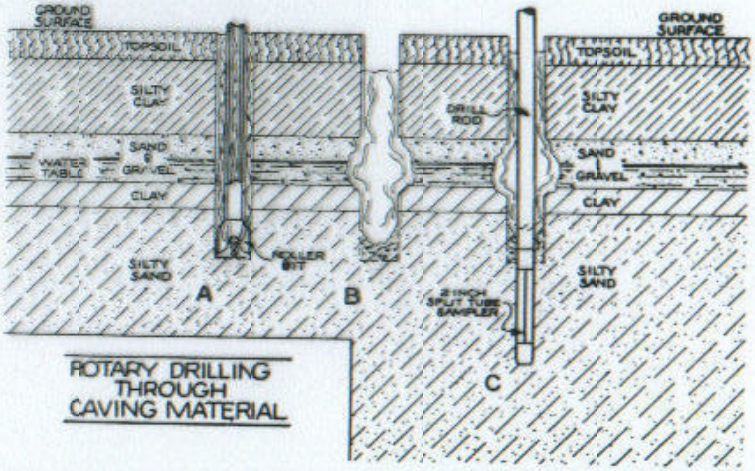
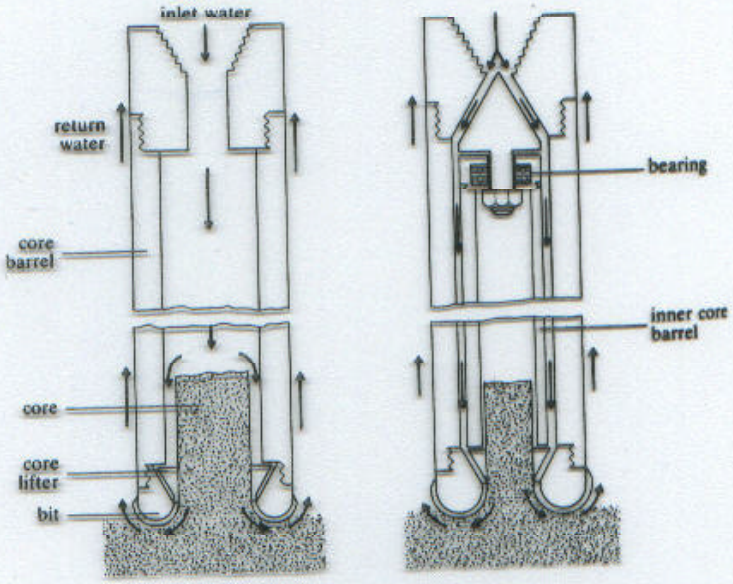


Figure 8. Rotary drilling through caving material. A. Rotary drilling advances borehole to below water table; B. Drilling mud holes borehole walls open to minimize "flow" and caving; C. Split spoon advanced at desired sample depth. *Source:* Unversity of Missouri, Rolla (1981).


inlet water
return water
core barrel
core
core lifter
bit
bearing
inner core barrel