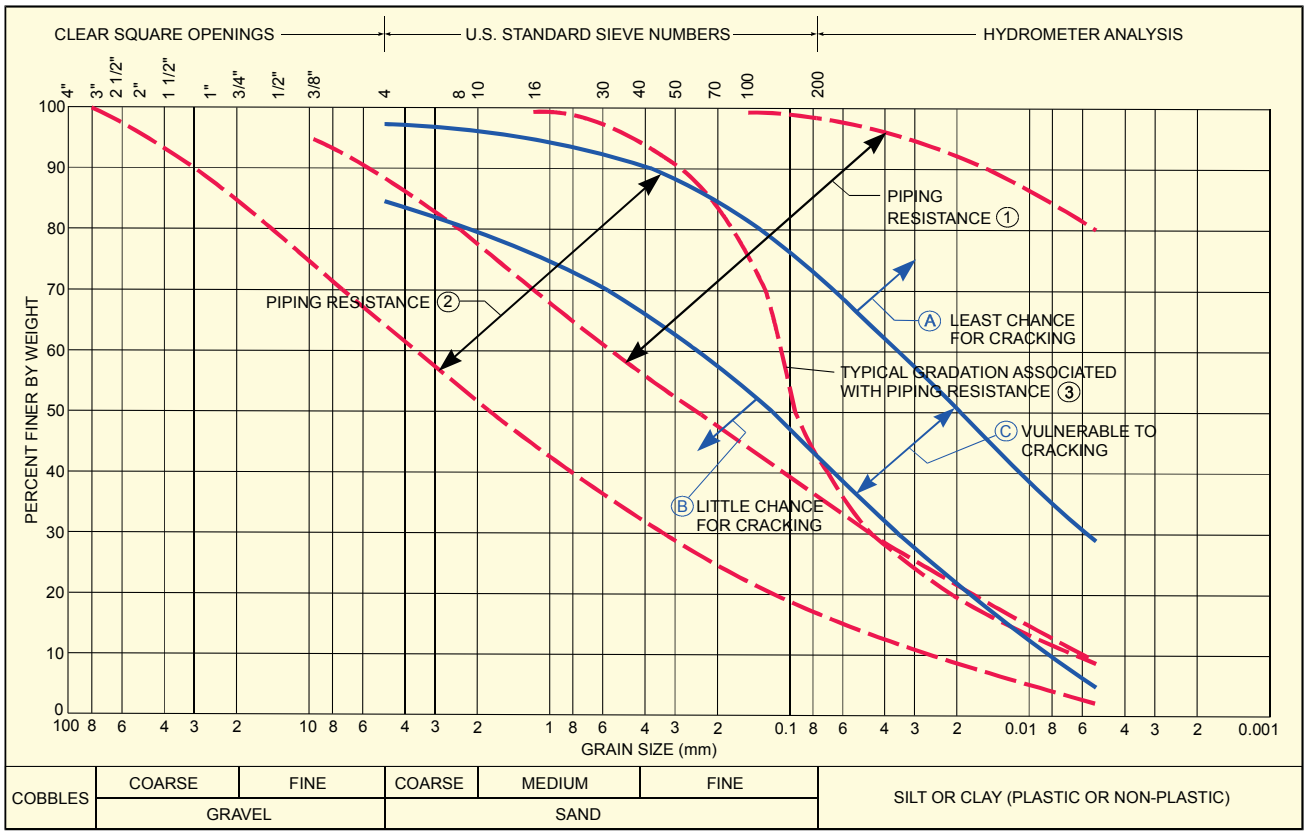

CATEGORY	MATERIAL	CHARACTERISTICS
PIPING RESISTANCE (1)	CL AND CH WITH PI>15, WELL GRADED SC WITH PI>15.	GREATEST RESISTANCE TO PIPING. SMALL AND MEDIUM CONCENTRATED LEAKS WILL HEAL THEMSELVES. EMBANKMENT MAY FAIL AS A RESULT OF SLOWLY PROGRESSIVE PIPING CAUSED BY LEAK OF ABOUT ONE-HALF CFS.
PIPING RESISTANCE (2)	CL AND ML WITH PI<15, WELL GRADED SC AND GC WITH 7<PI<15.	INTERMEDIATE RESISTANCE TO PIPING. SAFELY RESISTS SATURATION OF LOWER PORTION OF DOWN-STREAM SLOPE INDEFINITELY. MAY FAIL EVENTUALLY AS A RESULT OF EROSION CAUSED BY A SMALL CONCENTRATED LEAK OR BY PROGRESSIVE SLOUGHING. IF A LARGE LEAK DEVELOPS, PIPING CAUSES FAILURE IN A SHORT TIME.
PIPING RESISTANCE (3)	SP AND UNIFORM SM AND ML WITH PI<7.	LEAST RESISTANCE TO PIPING. USUALLY FAILS IN A FEW YEARS AFTER FIRST RESERVOIR FILLING IF SEEPAGE IS ABLE TO BREAK OUT ON DOWNSTREAM SLOPE. SMALL CONCENTRATED LEAK ON DOWN-STREAM SLOPE CAN CAUSE FAILURE IN A SHORT PERIOD OF TIME. HIGH DENSITY FROM COMPACTION INCREASES RESISTANCE SIGNIFICANTLY.
CRACKING RESISTANCE (A)	CH WITH D_{50}<0.02MM AND PI>20.	HIGH POST-CONSTRUCTION SETTLEMENT, PARTICULARLY IF COMPACTED DRY. HAS SUFFICIENT DEFORM-ABILITY TO UNDERGO LARGE SHEAR STRAINS FROM DIFFERENTIAL SETTLEMENT WITHOUT CRACKING.
CRACKING RESISTANCE (B)	GC, SC, SM, SP WITH D_{50}>0.15MM.	SMALL POST-CONSTRUCTION SETTLEMENT. LITTLE CHANCE FOR CRACKING UNLESS POORLY COM-PACTED AND LARGE SETTLEMENT IS IMPOSED ON EMBANKMENT BY CONSOLIDATION OF THE FOUNDATION.
CRACKING RESISTANCE (C)	CL, ML AND SM WITH PI<20, 0.15MM>D_{50}>0.02MM.	MEDIUM TO HIGH POST-CONSTRUCTION SETTLEMENT AND VULNERABLE TO CRACKING. SHOULD BE COMPACTED AS WET AS POSSIBLE CONSISTENT WITH STRENGTH REQUIREMENTS.

(DOD, 2005)

FIGURE 6.3 RESISTANCE OF CORE MATERIALS TO PIPING AND CRACKING

is not as critical to the design as it is for storage reservoirs. Where seepage occurs, it must be controlled such that it does not adversely affect the safety of the embankment or result in environmental impacts. The foundation conditions likely to be encountered beneath the starter dam are: (1) pervious foundation, (2) impervious foundation, or (3) impervious stratum at the surface underlain by a pervious stratum. An additional foundation seepage concern at some coal refuse facilities is the potential for fracturing due to subsidence of the ground surface above underlying mines.

Pervious foundations may consist of boulders, gravels, sands or mixtures thereof. For such foundations, measures to minimize seepage quantity and to provide controlled seepage discharge are