Theme 2.4 Engineering effects

- Cut Slopes
- Fill Slopes
- Spoil disposal
- Retaining wall foundations
- Road runoff

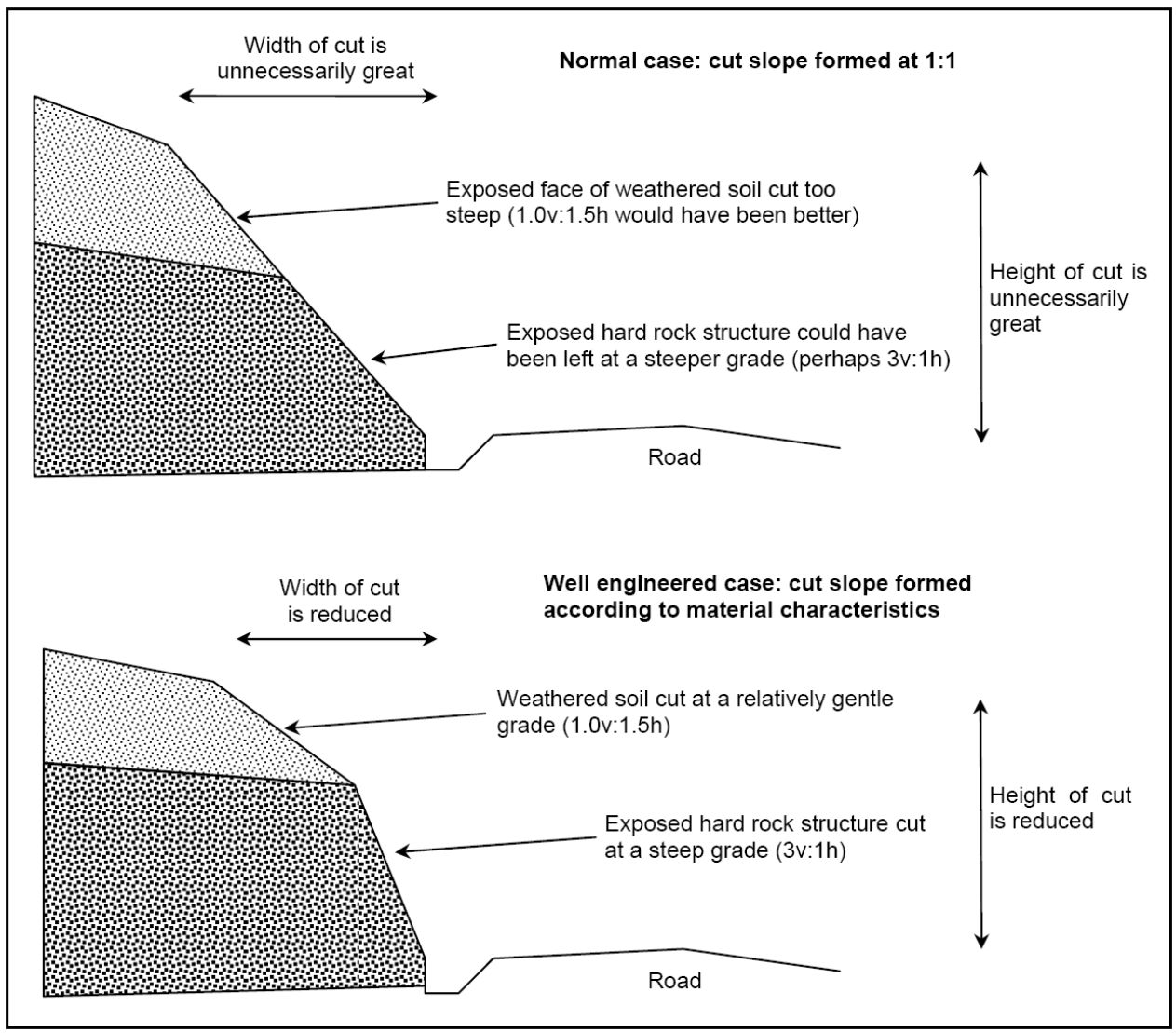
Cut Slopes

Table 3.1. MPWT slope cutting grades

Material	Slope Angle	Depth (d)
Cohesionless sands	1V:2H	
Residual soils	1.5V:1H	For d < 4 m
	1V:1H	For d > 4 m
Weathered rock	2V:1H to 4V:1H	
Sound rock	5V:1H to 10V:1H	

Source: *Road Design Manual* (MCTPC, 1996)

Cut slopes


Width of cut is unnecessarily great
Normal case: cut slope formed at 1:1
Exposed face of weathered soil cut too steep (1.0v:1.5h would have been better)
Exposed hard rock structure could have been left at a steeper grade (perhaps 3v:1h)
Height of cut is unnecessarily great
Road
Width of cut is reduced
Well engineered case: cut slope formed according to material characteristics
Weathered soil cut at a relatively gentle grade (1.0v:1.5h)
Exposed hard rock structure cut at a steep grade (3v:1h)
Height of cut is reduced
Road

Fill slopes

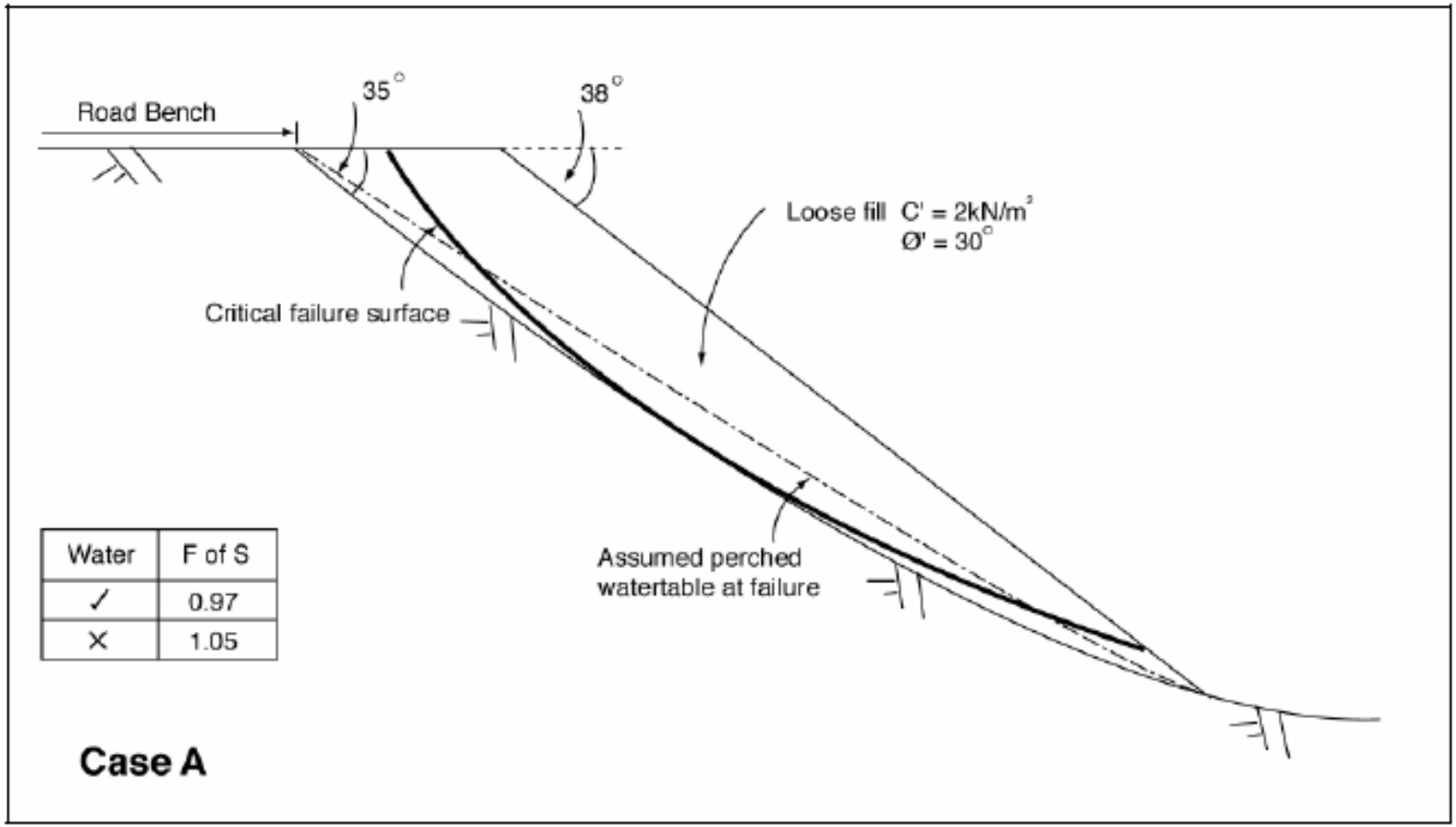
Table 3.2. MPWT grades for fill slope formation

Material	Slope Angle	Height (h)
Cohesionless sand	1V:3H	h < 1 m
	1V:2H	h > 1 m
Other materials	1V:3H	h < 1 m
	1V:2H	1 < h < 3 m
	1V:1.5H	3 < h < 10 m

Source: *Road Design Manual* (MCTPC, 1996)

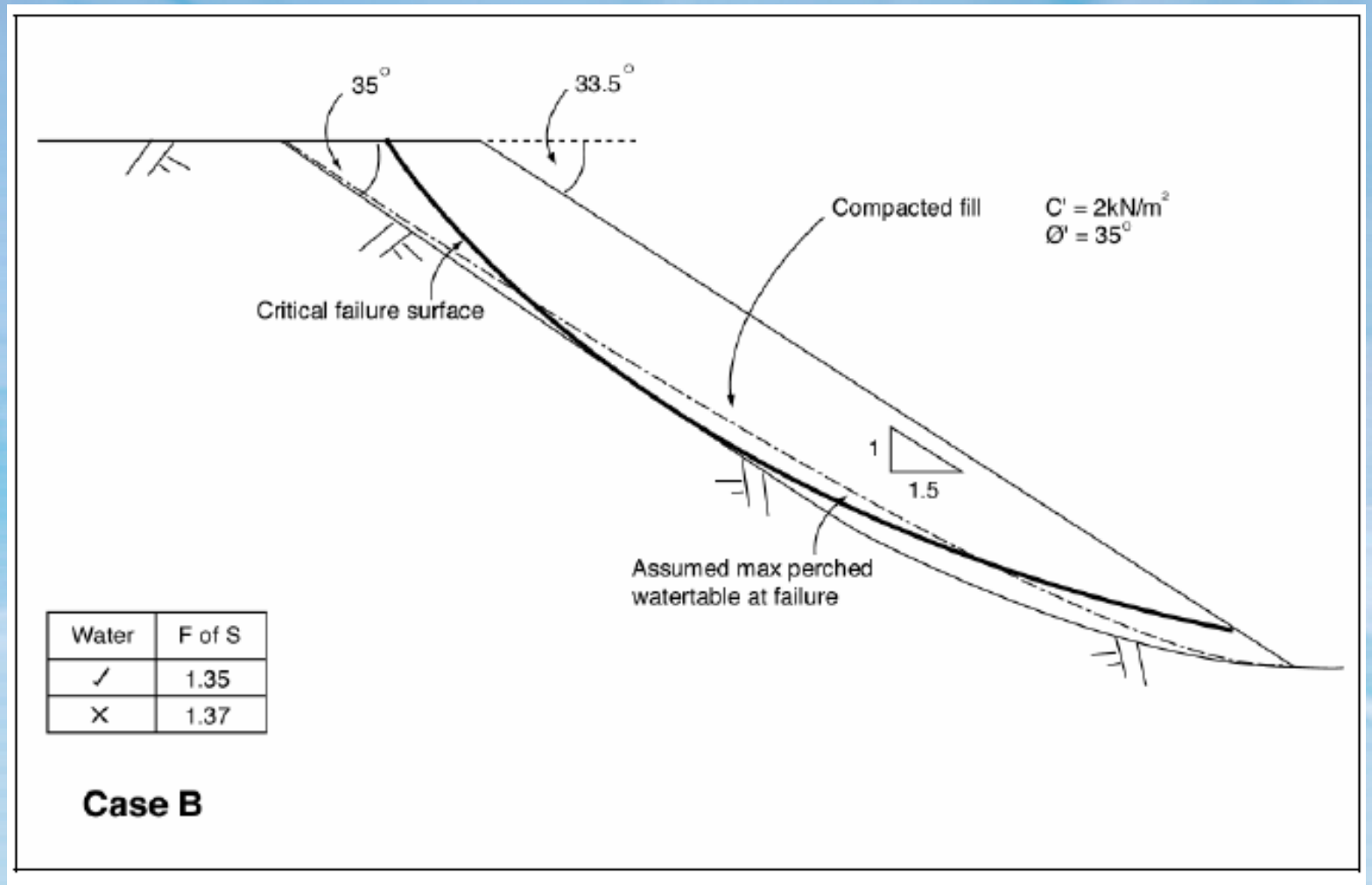
Fill slopes

Figure B-3: Typical failure in fill



Water	F of S
✓	0.97
X	1.05

Fill slopes



Water	F of S
✓	1.35
✕	1.37

Case B

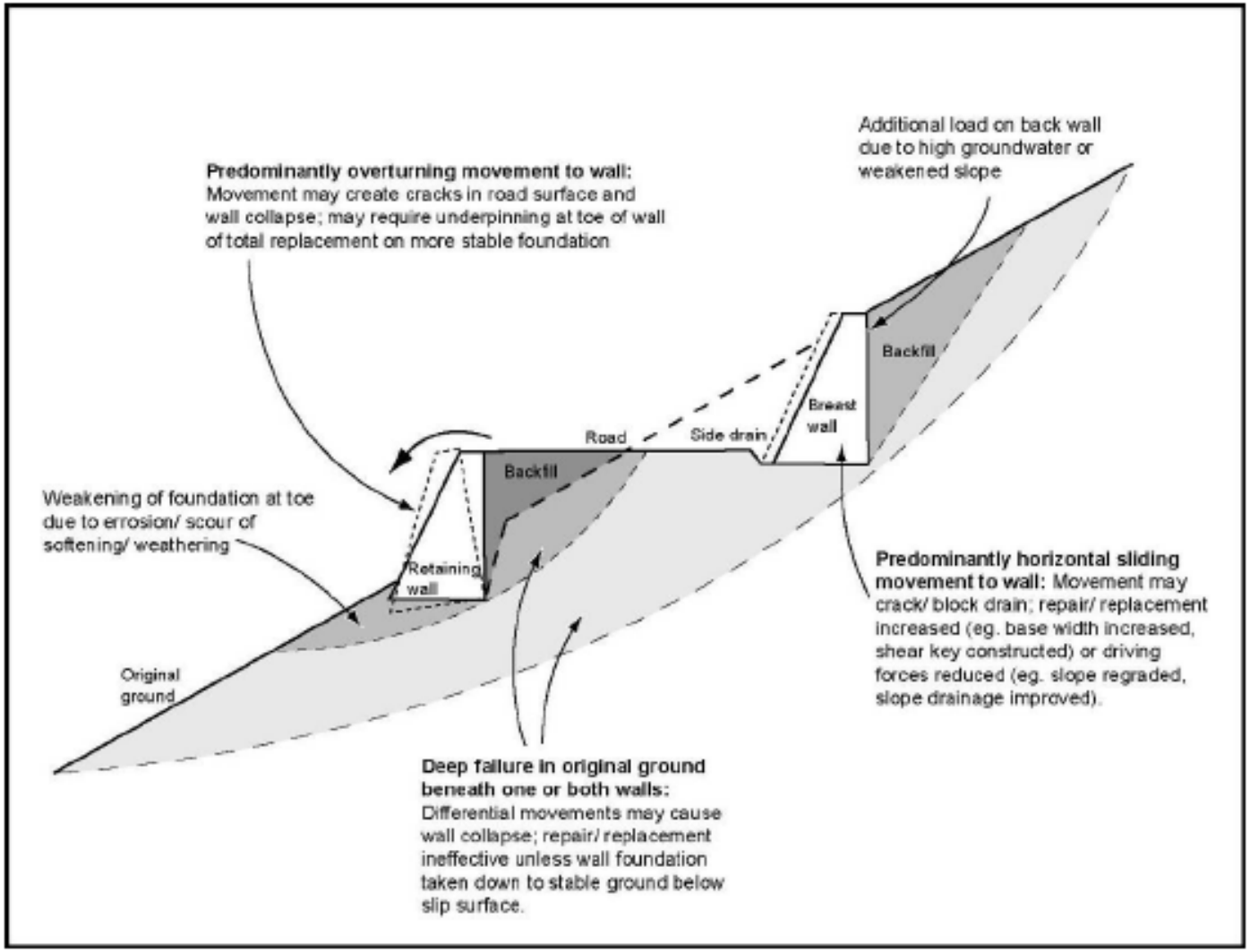
Spoil disposal

Spoil disposal

Spoil disposal

Spoil disposal

Wall foundations



Wall foundations

Wall foundations

Road runoff

Road runoff

Road runoff

Road runoff

Road runoff

Road runoff