Mars Rover Analysis

Rocky: 2 km/hr = 30 mins/km

Sandy: 3 km/hr = 20 mins/km

Smooth: 5 km/hr = 12 mins/km

Routes

Route 1

5 km

50 % rocky = 2.5 km × 30 min/km = 75 min

20 % sandy = 1 km × 20 min/km = 20 min

30 % smooth: 1.5 km × 12 min/km = 18 min

Expected Time:

= 75 + 20 + 18 = 113 mins

Route 2 7 km

40 % rocky = 2.8 km × 30 min/km = 84 min

40 % sandy 2.8 km × 20 min/km = 56 min

20 % smooth 1.4 km × 12 min/km = 16.8 min

Expected Time:

= 84 + 56 + 16.8 = 156.8 minutes

Route 3 6 km

10 % rocky = 0.6 km × 30 min/km = 18 min

50 % sandy = 3 km × 20 min/km = 60 min

40 % smooth = 2.4 km × 12 min/km = 28.8 min

Expected Time:

= 18 + 60 + 28.8 = 106.8 minutes

we should pick route 3

Route 1 w/ crater

Base: 113 minutes

intact (70 %) = save 20 mins, 97 mins

damaged (30 %) = add 15 mins, 128 mins

total expected time

(0.7 × 97) + (.3 × 128) = 67.9 + 38.4 = 104.8 minutes

pick Route 1 for updated routes

Route 3 w/ bridge

Base: 106.8 minutes

intact (40 %): same, 106.8 mins

damaged (60 %): add 40 mins, 146.8 mins

total expected time

(0.4 × 106.8) + (0.6 × 146.8) = 42.64 + 87.96 = 130.6 minutes

Satellite Analysis

Route 2, no rocky

Route 2 7 km

~~40 % rocky x 30 min/km = 210 min~~

40 % sandy x 20 min/km = 140 min

20 % smooth x 12 min/km = 84 min

assume rest is sandy

40 % sandy x 20 min/km = 140 min

Expected Time:

= 56 + 56 + 16.8 = 128.8 minutes

no rocky time

Probability not Rocky

60 %

If Rocky, it takes 156.8 minutes minimum

maximum

100 % rocky x 30 min/km = 210 minutes maximum

Don't wait, other routes are faster